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WE REVIEW:
PFS:Access
Apricot Computer
TI's New Portable
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SMARTMODEM 1200
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PERSONAL COMPUTING

DEPARTMENTS

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REMEMBER.

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The next addition to your family could be the bright little newcomer in the growing family of IBM® personal computers.

Name: PC*jr*. Weight: 12 pounds. Heritage: more than 30 years of computer experience.

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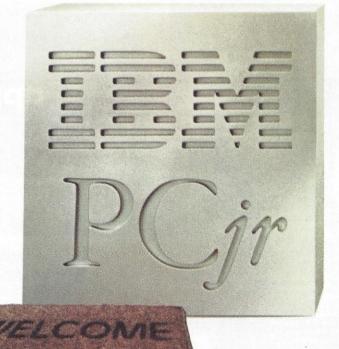
Add a printer. A diskette drive. An internal modem for telecommunications. Increase user memory from 64KB to 128KB. With these and other add-it-yourself options, even the lowest-priced PC*jr* can grow up *real* fast.

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Junior's starting model includes a 64KB cassette/cartridge unit and Freeboard for about $700. A 128KB model with diskette drive is about $1300. (Prices apply at IBM Product Centers. Prices may vary at other stores.)

Your local authorized IBM PC*jr* dealer proudly invites you to see this bright little addition to the family. For the store nearest you, just call 1-800-IBM-PCJR. In Alaska and Hawaii, 1-800-447-0890.

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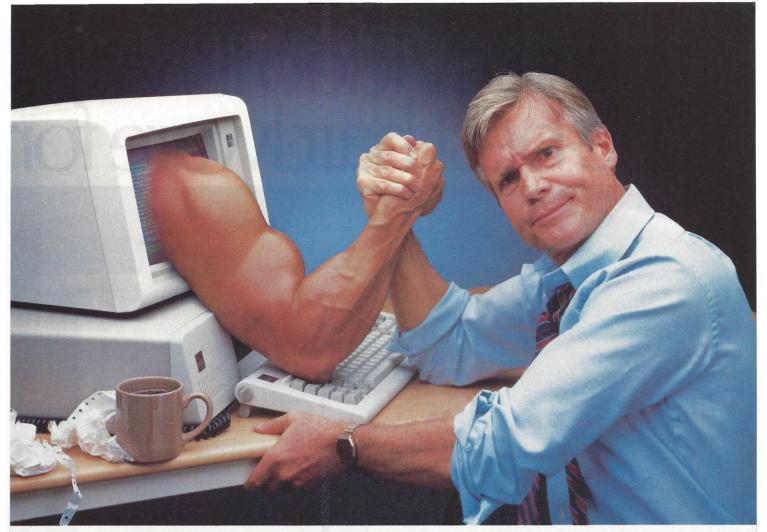
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CIRCLE 158

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If you don't have days, or even hours, to do projections with a spreadsheet, consider this:

There is now a highly specialized software tool expressly for the business person who needs the answers more than the workout.

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If you want to do forecasts and budgets, return on equity, discounted cashflows, net present values, capital expenditure analysis, interest calculations, depreciation comparisons or taxation scheduling without setting up the mathematical calculations or laying out a spreadsheet, you need Profin.

Profin is an easy-to-use (menu-driven) program which leads you through your business analysis step by step. You simply answer the questions as they appear on the screen.

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- income statements
- interest schedules
- capital expenditures
- tax schedules
- returns on equity
- discounted cashflows
- and balance sheets.

You can then make any changes to any of the information already entered and look at revised reports.

And you can automatically load your Profin reports onto a Multiplan, VisiCalc, SuperCalc or Lotus 1-2-3 screen (or any other spreadsheet that reads D.I.F. files) to carry out further manipulations.

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Also available: PLANFIN.™ For sales, marketing and other executives who just want simple forecasts and budgets, Planfin gives you operating income statements plus net income and discounted cashflow reports in less than 15 minutes. Under $200.
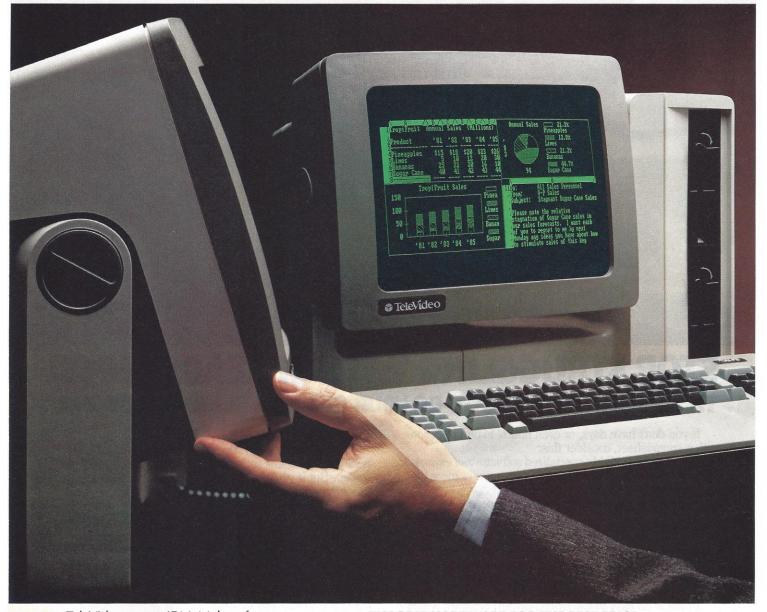
BUSINESS SOFTWARE™

CIRCLE 160

The TeleVideo IBM PC
The best hardware for

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Because every TeleVideo Personal Computer offers the highest level of

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Features	Tele-PC	IBM PC	Tele-XT	IBM XT
Monitor	YES	OPTIONAL	YES	OPTIONAL
Screen Size	14"	12"	14"	12"
Tilt Screen	YES	NO	YES	NO
Quiet Operation	YES	NO	YES	NO
Memory	128K	128K OPTION	256K	256K OPTION
Graphics Display (640x200 resolution)	YES	OPTIONAL	YES	OPTIONAL
Printer Port	YES	OPTIONAL	YES	OPTIONAL
Communication Port	YES	OPTIONAL	YES	YES
MS™-DOS/BASIC®	YES	OPTIONAL	YES	OPTIONAL
System Expansion Slot	YES	YES	YES	YES
Typical System Price	**$2995**	**$3843**	**$4995**	**$5754**

compatibles.
the best software.

IBM compatibility on the market and has the standard—not optional —features you need to take full advantage of every job your software can do.

Study the chart at the left. It proves that TeleVideo—not IBM— offers the best hardware for the best price.

Note that TeleVideo's ergonomic superiority over IBM extends from fully sculpted keys and a comfortable palm rest to a 14-inch, no glare screen that tilts at a touch.

THE BEST MICROCHIPS.

What is perhaps most impressive about the TeleVideo IBM PC Compatible can be found deep within its circuitry. We use the same 8088 central processing unit that runs an IBM PC. But we also employ new VLSI (Very Large Scale Integration) microchips that are designed and built exclusively for TeleVideo. These interface more efficiently with the powerful 8088 and yield numerous benefits.

For example, our tiny custom chips do the work of many of the larger, more expensive circuit boards in an IBM PC. So we can offer a computer system that comes in one attractive, integrated case, is ready to run and occupies less desk space. A computer that edges out IBM's added-cost component system for reliability, ease of service and purchase simplicity.

Fewer circuit boards to cool also allowed us to eliminate the noisy, irritating fan IBM and most other

THE BEST PORTABLE FOR THE BEST PRICE.

Features	TPCII	COMPAQ
High Capacity Storage	Yes	No
2nd Disk Drive	Yes	Optional
Quiet Operation	Yes	No
Ergonomic Display	Yes	No
Communication Port	Yes	Optional
International Power Supply	Yes	No
MS™DOS 2.11	Yes	No
Typical System Price	**$2995**	**$3710**

PCs force you to put up with. And TeleVideo compatibles accept any IBM hardware options without modification.

THE BEST LINE.

But the Tele-PC is only one element of the TeleVideo IBM PC Compatible line.

The TeleVideo XT is the best hardware for users of popular IBM XT software who would appreciate an extra 10 megabytes of storage capacity along with the advantages listed on the preceding chart.

As the chart above demonstrates, our portable IBM compatible computer, the TPC II, is far and away better hardware than COMPAQ.™ Better hardware—standard—at a better price.
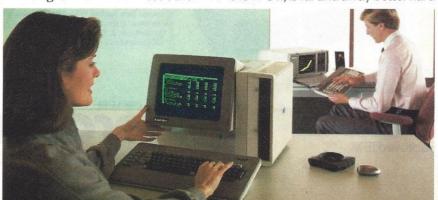
THE BEST MANUFACTURER.

The TeleVideo IBM PC Compatible line is made by the world leader in multi-user computer systems and the number one independent manufacturer of terminals.

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Before you invest, make a few simple comparisons. You'll find that TeleVideo—not IBM or COMPAQ —has the best hardware for the best software. At the best price.

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TeleVideo®
Personal Computers
TeleVideo Systems, Inc.

CIRCLE 151

The next most precious gift

The love of learning

Next to your love, you can give your child nothing more precious than the confidence and the joy that comes from learning.

Now you can provide a new kind of learning experience for your child: an opportunity to develop thinking skills at a very early age, in a very natural way. At last, The Learning Company™ software truly fulfills the educational promise of the personal computer.

The Learning Company's 11 award-winning programs are as colorful, as fast-moving, as many-faceted as a child's curiosity. Your child will grasp new concepts eagerly as each success opens the door to a new challenge in logical thinking. As an adult, you will notice how skillfully The Learning Company's educators and software designers have combined sophisticated teaching techniques with pure fun.

What will you see as your child explores the wonders of The Learning Company software? Possibly a delighted three-year-old building *Juggles' Rainbow*™ in brilliant color. Perhaps an utterly fas-

cinated five-year-old sorting out the tall thin red Gribbits and short fat blue Bibbits in *Moptown Parade*.™ A seven-year-old, a ten-year-old or even a teenager, deeply involved in designing logical kicking machines to control *Rocky's Boots*.™

What's your reward? It may be a moment of shared pride as your six-year-old shows you the solution to one of *Gertrude's Puzzles*.™ Or it may be the special satisfaction you feel when your grown-up teenager calls home from college to say that Boolean algebra seems, somehow, very familiar.

You can be sure of one thing. It will be very precious.

The Learning Company™

Epson.
For those who need it, simplicity.

One computer.

Two points of view.

The Epson QX-10 personal computer.

To many, the Epson represents the ultimate in simplicity.

Just press a single key for the function you require: word processing, scheduling, business graphics, address book or file management. One keystroke produces your program. There are no rigamaroles to remember. No disks to change.

The result: you start to work immediately. And you start being productive, immediately. With step-by-step prompts. In plain English, not computerese.

Simplicity itself.

Or is it?

The plain fact is that the ease of operation the Epson offers today is accomplished with a degree of technological sophistication most other computers can only promise for tomorrow—specifically, fully integrated software, operating in an interactive environment.

The few other computers offering such "simplicity" cost $5,000 to $15,000 more. And most other computers can't offer it at any price. Which makes one wonder exactly what they do offer, in terms of either simplicity, or performance.

HOW MUCH CAN YOU DO ON THE EPSON? HOW MUCH ARE YOU READY TO DO?

The Epson's ease of operation may spoil you, but it certainly won't limit you.

Case in point: every Epson comes complete with an integrated software system—*Valdocs*®—to effortlessly provide the basic functions for which most people buy computers. The Epson also comes with *CP/M*®-80 2.2, so you can choose from the hundreds of programs in the CP/M library. And only Epson offers an exciting new collection of seven best-selling programs now specially enhanced to give you every powerful feature, plus Epson one-button simplicity. Included are

dBase II,® *Friday!*,™ *Microplan*,® *Graphplan*,™ *WordStar*,® *SpellStar*,® and *MailMerge*.® And the Epson also allows you to add *MS*™-*DOS* compatibility, so you have access to best-sellers like *Lotus*® *1-2-3*.®

Best of all, you will run the software of your choice on the computer of choice. The high-performance Epson. With 256K RAM. 128K dedicated video memory. The breathtakingly sensible *HASCI*™ keyboard. Dual 380K double density disk drives.

2+2=
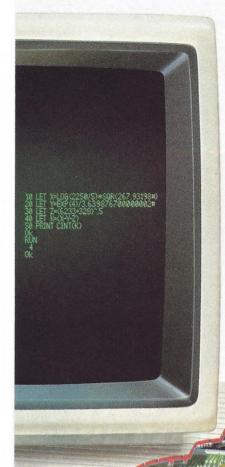
Graphics capabilities unequalled in its price range. A high resolution monitor, 640 by 400 pixels, for clarity few computers in any price range can offer. Plus, an RS-232C interface, a parallel printer interface, and internal space for up to five peripheral cards so you can expand your Epson as your needs require.

One further point: all these features, and quite a few more, are included in the Epson's $2,995 price. Some com-

Epson.
For those who can handle it, performance.

```
10 LET X=LOG(2250/5)*SQR(267.93198#)
20 LET Y=EXP(4)/3.6398676700000002#
30 LET Z=(6233+328)^.5
40 LET K=(X-Y-Z)
50 PRINT CINT(K)
Ok
RUN
 4
Ok
```

puter companies ask you to pay extra for features like these. Most can not offer them at any price.

That, too, is performance. The kind of performance that can make choosing a personal computer very simple, indeed.

EPSON QUALITY. OR, WHY WONDER WHAT TERRIBLE KLUDGES LURK IN WHICH SLEEK BOXES.

If you know computers, you know Epson. Epson printers set the industry standard for quality, reliability and value. Rest assured, the same can be said for the Epson personal computer.

The satisfying silence of the slim, Epson-designed disk-drives is one way for you to judge or, for an inside-out perspective, here is an excerpt from a review by Jim Hanson in the April, 1983 issue of *Microcomputing.**

"The Epson QX-10 is soundly designed and executed. I looked hard and found no evidence of kludging or shorting out anything in the name of economy. All the connectors have gold on them and are of quality manufacture. The printed circuit boards are heavy, with soldermarks on both sides of double-sided boards. The circuit boards are completely silk-screened with component labels, and the layout is as professional and clean as you will find anywhere."

Isn't this what you expect? After all, it's an Epson.

A WORD TO THE WISE: GET YOUR HANDS ON THE EPSON.

Is the Epson a simple, easy-to-use computer for beginners? Or a sophisticated high-performance computer for the experienced? The answer is "yes." And when you think about it, aren't those two computers the one you need now.

For technical specifications, and the complete, 3-part *Microcomputing* review, along with the name of your nearby Epson dealer, call toll-free (800) 421-5426. California residents, call (213) 539-9140.

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Richard Leech

EPSON
STATE-OF-THE-ART...SIMPLICITY.

Mobility And Versatility For The Busy Professional

PFS: Access ■ **Apricot** ■ **ScratchPad With Voice Drive**
■ **TI Portable Professional Computer** ■ **Senior Partner**
■ **Certified Accounting System**

MAKING THE DIRECT CONNECTION

by Lynn Walker, Assistant Editor

Anyone who's ever tried to hook up to a data base service such as The Source with a communications package knows what a chore it can be. On-screen prompts are cryptic or non-existent. Often, it takes several tries just to connect with the service. You may be left shrugging your shoulders, never discovering why the program didn't work the first few times and what "magic" caused it to suddenly connect.

The user who wants to access several data base services confronts even more obstacles. Each service, with its own curious log-on procedure and exacting protocols, can demand precious minutes of your time simply remembering how the darn thing worked.

With Software Publishing Corporation's new communications software offering, PFS:Access, the user is only one keystroke away from connecting with any data base service around. With the push of a key, you can select CompuServe, Dow Jones News/Retrieval, MCI Mail, The Source, and Western Union EasyLink services. You can also customize the menu by adding or substituting services with selections of your choice.

PFS:Access features an additional capability users may not expect: data encryption, to assure complete privacy of data. Files you send to a Source mailbox to be picked up by someone else can be scrambled so no one can read them unless they know the identifying password. PFS:Access is by no means a typical communications package. The folks at Software Publishing Corp. didn't intend it to be. While most existing communications software allow users to do two things—access public information services and communicate with other people via personal computers—PFS:Access allows you to do only one.

"Our product is strictly for accessing a data base or time-sharing service," says Susan Gersh, product manag-

er for Software Publishing Corporation's PFS:Access. "We don't think combining the two functions can be done cleanly."

As the Software Publishing staff identified the two separate communications applications which many manufacturers "squeeze into one box," they realized they wanted to design their software in a way that made more sense to them. So rather than bite off what they thought was a too-big chunk, Software Publishing put the functions into two separate software packages. PFS:Access is the first of this communications product line. Coming in late summer, Gersh hints, is a second communications package which allows file transfers from personal computer to personal computer.

Although you'll still need a modem and will still need to sign up with data base services, using PFS:Access is in many ways different from other communications packages. "We've made it much easier to access data base services," Gersh says.

When first booted up, for example, the PFS:Access screen shows a main menu with a list of five different data base services to choose from. Pertinent technical information about each of the services and the communications settings they use is already in the program. You don't need to input them. And there's no guessing about mysterious prompts, as in so many communications packages. On the bottom of the screen, in plain English, the user is asked to select the service he wants to connect with.

Once the user has chosen a service, PFS:Access menus will take him by the hand and guide him through the log-on procedures, transforming the blank screens of many communications packages into tangible steps. You won't have to deal with terms such as full duplex and macro log-ons in this program. It is designed for the non-technical user.

The first time you use the program to connect with a data base service, you must "teach" it how to make the connection by manually taking each step in sequence.

PFS:Access and its English language menus make the process enormously easier, but you will still have to figure out some log-on steps by wading through documentation provided by the data base services themselves.

But here's the good news: Once you've gone through the log-on steps that first time, *you will never have to do it again*. The program remembers. By telling PFS:Access when to start "learning" and when to stop, you are creating an automatic sign-on. From then on, the push of only one key gets you past dial-up, past log-on, and into the service.

If you decide later you want the program to "un-learn" that sign-on procedure—say a service has made changes in its dialing sequence—that's no problem. PFS:Access will let you "teach" the program a new automatic log-on, simply by repeating the create sign-on process.

After accessing public information services, PFS:Access users can send, save, and/or print information. All the necessary commands are right there, on the bottom of the screen.

To reduce on-line time and save money, you can create documents off-line with PFS:Write and almost any word-processing package (as long as the files are ASCII text files and the data is printable), and transfer the files to the service when desired. You can string together several files to send at once. Others can then pick up these files from the information service.

PFS:Access also allows users to send PFS:Report and PFS:Write files via a service. This is a first, since PFS:Write and PFS:Report users have in the past been unable to send files made in these programs via communications software.

As for sending files made in PFS:File, however, users will have to wait for that capability until Software Publishing's file transfer program comes out in a few more months. The roadblock is that PFS:File stores data in a combination of binary and ASCII codes which public information services cannot accept. That information will have to be transferred directly from personal computer to personal computer.

Nuts and bolts

You'll make a copy of the PFS:Access disk to start with. Then you'll begin with the main menu. Choices one through five are the selections for the five data base services; six, seven, and eight allow you to access three "other services"; choice nine is "choose modem"; and choice "E" is exit.

The first time you use the program, you'll begin by selecting the choose modem option, where you'll identify your modem. Ten popular models are listed on screen, including modems from Bizcomp, Hayes, Novation, IBM PCjr, U.S. Robotics, and Ventel. There's an eleventh choice, "other," if your modem is none of those listed.

The PFS:Access (Software Publishing) Main Menu lets you hook up to as many as eight different on-line data-base services.

Because Access doesn't know the codes required by your unlisted modem, you will have to enter these later, during the dialing process. If your modem is listed, all pertinent information for it is in the program; you don't have to worry about it.

Now you will press F10 or the enter key, to return to the main menu. From here, you can select any of the pre-defined services, or you can add a service by selecting number 6, 7, or 8. This is where PFS:Access really starts to shine.

You will very likely be using one of the five pre-defined services. PFS:Access will provide all the technical information you'll need, making them a breeze to start using: data bits, stop bits, parity, half or full duplex. The program has done the homework for you. All you'll need to do is input your modem speed, which is the number of bits sent per second (either 300 or 1200, depending on your modem), and the local telephone number to access the service. You'll get this from a list of phone numbers you'll receive from your service. The number you use depends on what city you are in. All the rest of the information has been included in the PFS:Access package.

The program carries ease of use a step further. You can enter the phone number in several ways—with parentheses, hyphens, or spaces—and the program will accept them all.

At the prompt, you can enter Y to signal PFS:Access to store your sign-on producure so future access to this service is automatic. Next, PFS:Access will connect you with the service of your choice.

If you make any errors, by the way—typing in a number or letter not on the menu, for example—you'll get a beep and a handy explanation on the bottom of the screen, telling you what you've done wrong and what to do next.

Choosing item nine on the PFS:Access Main Menu gives you the Choose Modem menu, which asks you to identify your modem.

After choosing a service, enter its name, phone number, and your modem speed. These steps can be saved for future log-ons.

If you've tried to hook up to a service without first defining your modem, for example, you'll get a message, "Must first choose a modem." This is a welcome feature when you're new to telecommunicating. You'll never be stranded.

Once you've connected to the data base of your choice, which should take only seconds after you've created the automatic log-on the first time, you can begin gathering information, which is the reason you've hooked up to the data base service in the first place. The documentation instructs you to "use (the services') commands as you desire."

In addition to the information services' commands and capabilities, PFS:Access has some commands of its own. You can scroll through the text, viewing portions of your session and stopping transmission temporarily. You can send a file, save to disk, print, get help, or hang up, all by pressing function keys.

In the scrolling feature, information can be captured from an information service into the program's 32k memory buffer, to be reviewed off-line if you want to minimize service connection costs. Or, you can review the information on-line, scrolling back to a line you may have missed. This scroll buffer, incidentally, is a feature which most communications packages do not include.

If you find you need help while in the data base service, you won't be thrown to the wolves. PFS:Access provides all the commands on the bottom of the screen that you'll need to manipulate the information you're gathering. There's no need to escape back to other menus.

To leave PFS:Access, return to the main menu by pressing F3 (disconnect), and then F10 to confirm you're out of the service.

On the very first page of the software's manual, the reader is told about an instructions section at the end of the manual, written for those who are "generally familiar with communications software and services." Those few pages are a gem. They give the familiar and unfamiliar user alike a non-jargoned briefing of what he'll need to know in order to use the program, and then tell which chapters to head for if more details are needed.
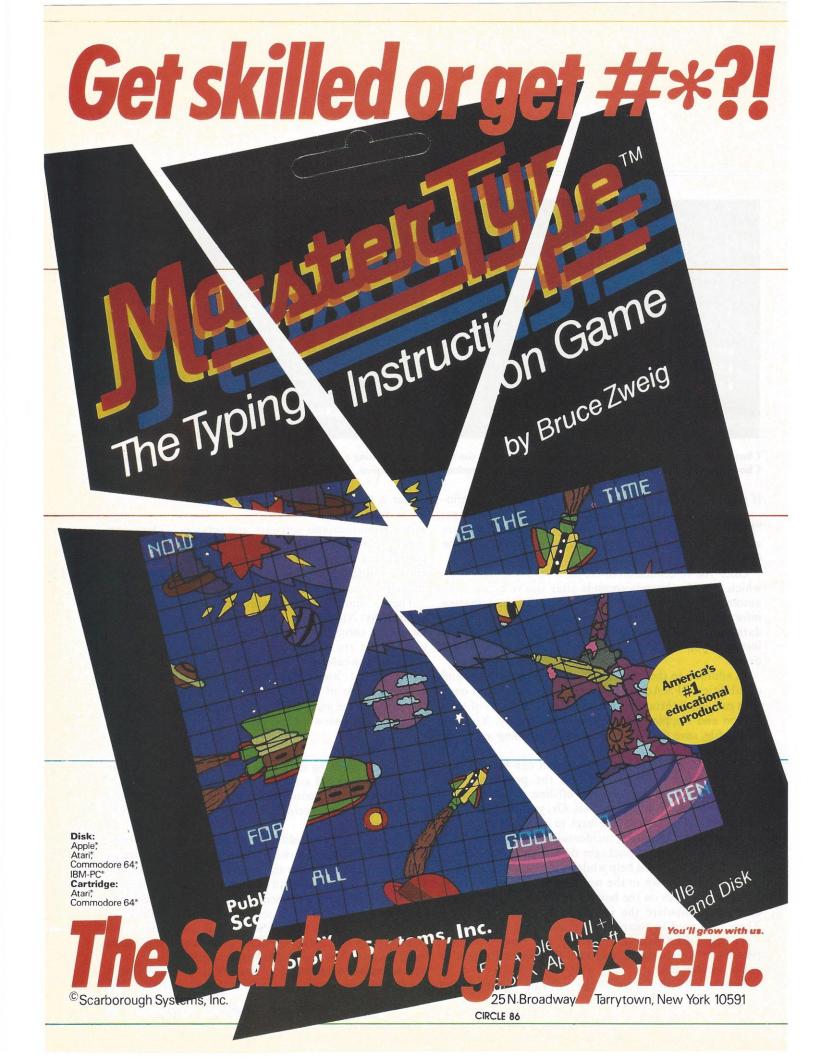
There's another section which also seems especially noteworthy: Appendix C, which provides subscription information, communications settings for the different services (these are already provided on the disk; they are added here in case you've deleted a service and later want to restore it), and instructions for signing on to free demonstrations of the services, if they are available, so you can practice using PFS:Access even if you haven't yet received your password.

Loose ends

If you plan on using data base services at all, this is one program that could save you lots of headaches. It takes the fear out of telecommunicating. There's nothing mysterious about the process—at each screen, you're privy to what's going on.

PFS:Access will be sold through retail computer stores. The MS-DOS version, with a suggested retail price of $95, should be available this month. The Apple IIe version, with a suggested retail price of $70, will be available in May. A Macintosh version is also planned, although no price or shipping date is set yet. Software Publishing Corporation reports that PFS:Access is completely compatible with the major services, and should work with most popular 300- and 1200-baud modems.

FOR MORE INFORMATION: SOFTWARE PUBLISHING CORP., 1901 Landings Dr., Mountain View, CA 94043; (415) 962-8910.

NEW BRITISH COMPUTER IS MORE THAN JUST A PRETTY FACE

Jacqueline Rae, Associate Editor

The Apricot personal computer from Applied Computer Techniques, Inc. (ACT), a leading British computer manufacturer, stood out from the multitude of "me too" products shown at Comdex last December. And well it should have—this is a nice-looking computer with sleek components, ergonomic design, and a high-resolution display.

But this new British offering offers a lot more to the consumer than just a pretty face. According to Chris Williams, a technical consultant with ACT, the Apricot is a "fourth generation" personal computer packed with state-of-the-art hardware and software which make it both powerful and easy to use—even for a novice. But, adds Williams, in addition to being designed for ease of use for the beginner, the Apricot has also been designed to give flexibility to the more sophisticated user.

The Apricot is a businessman's computer, a concept which is reflected in the fact that the software offered with the machine is geared toward the business user. It includes the SuperCalc 1 spreadsheet program (upgradeable to SuperCalc 2 or 3 at additional cost), a calendar/address program called SuperPlanner, BASIC, and asynchronous communications software.

Surprisingly, ACT doesn't provide a word-processing program with the Apricot. Williams explains that a word processor was omitted because most users prefer to select their own package, depending on the degree of sophistication required or the package they've used in the past.

Compact, flexible, and fast

Using the Apricot is really a pleasure. The computer is small and compact, taking up very little room on the desk. It features the new Sony $3\frac{1}{2}''$ micro disk drives, which use the sturdy hard-shell floppy disks. Also, a special feature of the Apricot's standard software is a transfer utility in the communications software which allows you to download IBM Personal Computer $5\frac{1}{4}''$-based software to the $3\frac{1}{2}''$ disk format. (This assumes the computer you're downloading from also has asynchronous communications software.)

The Sony drives are remarkably quiet, and the $3\frac{1}{2}''$ disks seem to be much tougher than their $5\frac{1}{4}''$ counterparts. They also seem to slide into the disk drive more easily, and the hard covering on the disk makes them feel more substantial and sturdy. To remove a disk from the drive, you simply push a square button located next to each drive.

The Apricot also comes with three operating systems: MS-DOS 2.0, CP/M-86, and Concurrent CP/M-86, which means it will run most of the popular software

packages available on the market as they become available on the $3\frac{1}{2}''$ microfloppy. However, Williams did point out that the Apricot doesn't run Lotus 1-2-3. The UCSD p-System is also available at additional cost.

The Apricot is built around Intel's 8086 16-bit microprocessor, making it faster and more efficient than the IBM Personal Computer, which uses the 8088 processor. The system, configured with two disk drives, has 630k of disk memory with single-sided disks and 1.44Mbytes with double-sided disks. It includes a standard 256k of RAM—expandable to 768k internally—and two expansion slots.

Two external ports are provided at the back of the unit for a printer or other peripherals—an RS-232 port and a standard parallel port. Also included is a mouse port (called the Mousetrap), which is located on the back of the keyboard. An on-board modem with auto-dialing is optional.

These features contribute to Apricot's ease of use which is clearly demonstrated by the computer's menu system. When you load the Apricot master system's disk,

The Apricot portable computer features a MicroScreen on the keyboard, $3\frac{1}{2}''$ drives, three operating systems, and 256k.

the operating system and a program called Manager are booted. The Manager is a tool that the manufacturer has installed on top of the operating system to make it easy for you to use.

Just as with MS-DOS based systems, the first thing you see when the system is booted is the A>prompt. Then a menu appears, which is divided into a grid of boxes. This grid is the Manager, and it contains a list of all the software programs installed on the system.

You select an item (the program you want to use) from
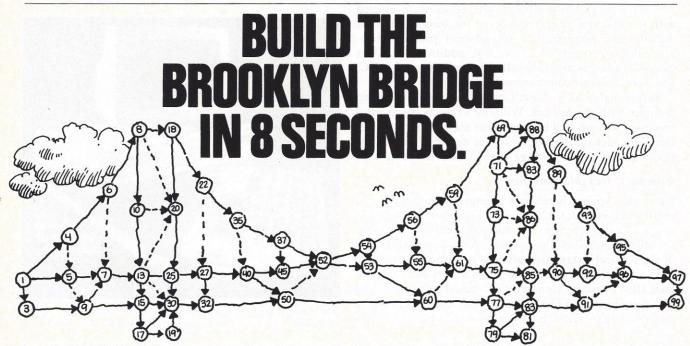
the menu by moving the cursor around the grid with the cursor control keys. Then, after you insert that program's disk into the drive, simply hit Return and the system automatically brings up the menu for that program. Allowing you to load a program in this manner spares you from having to first boot up your system disk, insert your program disk, and tell the computer to, for example, "Load SuperCalc." The system loads it for you. If, on the other hand, you want to use a program other than those installed in the Manager, you would simply bypass the Manager menu by pressing the Finish key. This will take you directly to the operating system, at which time you can load your program manually.

Highly flexible hardware

The Apricot includes many practical features you'll want to use often. Its MicroScreen feature—an 80-character, liquid crystal display (LCD) located on the computer's keyboard—displays the day, date, and time in standard mode. There are six programmable, touch-sensitive keys

designed for use with the MicroScreen, and, by employing the Calc key—one of the keyboard's eight special function keys—you can transform the MicroScreen into a calculator; an especially handy feature if you're in the middle of text and need to do a quick calculation. The other special function keys are Help, Undo, Repeat, Print, Intr, Menu, and Finish. The keys are labeled in accordance with their function, as with the Calc key, so there's little mystery as to what each key means.

Transforming the MicroScreen into a calculator at the touch of a key is one example of the kind of flexibility you get with the Apricot. In fact, the entire keyboard can be programmed to suit the user's particular needs with a software utility called Keyedit, which is supplied with the computer. The key caps also lift off so you can design your own keyboard. In addition to Keyedit, the system offers a a utility called Fontedit which allows you to generate new character sets for the display, and Logoedit, which allows you to design your own logo.

The keyboard on the Apricot is very sensitive, some-

thing most touch typists will appreciate. In addition to the standard typewriter keys and eight programmable function keys, it also features a numeric keypad.

The six touch-sensitive keys under the MicroScreen offer quick access to software functions, and can be programmed for individual software packages.

The Apricot's monitor—included with the system—is another well-designed feature. It consists of a 9″ green phosphor display screen (800 by 400 pixels), which features an anti-glare optical filter and offers high-quality resolution. (Williams says the company will offer an add-on color card in the near future, which would take up one of the expansion slots the Apricot provides.) In spite of its smaller size, the resolution is very good, with adjustable brightness and contrast. I found it much easier on the eyes than the monitors I've worked with in the past. The monitor is also adjustable, so you can tilt or swivel it.
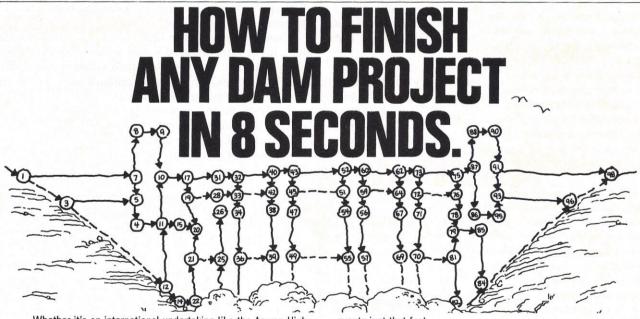
Weighing in at 17.5 pounds, the Apricot is a transportable system. The keyboard snaps to the bottom of the main unit, and a sliding panel covers the disk drives and protects them from dust. When the cover of the unit is closed, the computer can be carried using a recessed handle. The Apricot's monitor also has a handle, for easy transportability between home and office, although ACT recommends that you purchase a second monitor (at a cost of $300) if you plan to move the computer back and forth frequently. The reasoning behind this is simply that the MicroScreen has only a two-column display (at 80 columns), and is not designed to be a substitute for a monitor. So, to make frequent transporting from office to home easier, it pays to consider a second monitor.

For people who value aesthetics and functional design, the Apricot is a good choice. It offers power, flexibility, and expandability—all in one transportable system.

The basic Apricot system with two disk drives and 256k RAM retails for $3190, and Williams says a 10Mbyte hard disk version will be available in the third quarter of 1984.

FOR MORE INFORMATION: Applied Computer Techniques, 3375 Scott Blvd., Santa Clara, CA 95051; (408) 727-8090.

TALK TO YOUR COMPUTER AND GET A PROFESSIONAL-LOOKING SPREADSHEET

by Arielle Emmett, Contributing Editor

Every once in a while, a product comes along with the word "Future" stamped on it. Supersoft's ScratchPad with VoiceDrive—the first practical voice-driven spreadsheet designed for use on a personal computer—promises and delivers the future *now*.

Linked to a plug-in voice recognition board, VoiceDrive gives either an IBM Personal Computer or the Texas Instruments Professional Computer the ability to recognize speech and translate it into commands which the system's spreadsheet "understands." The user, in effect, talks to the computer, enters data, moves the cursor, and fills in most of the details of the spreadsheet without touching the keyboard. How's that for science fiction?

Wasn't it only 15 years ago that two fictional astronauts were gabbing with the mainframe computer HAL in "2001"? Now Supersoft comes along with a speech recognition program for the personal computer—"the first applications software product fully integrated with voice-driven hardware," says Supersoft's president Herb Schildt.

In developing the VoiceDrive system, Schildt has attempted to make something that is very complex seem simple. "The VoiceDrive integrated package sits between the voice-recognition hardware and the applications (spreadsheet) software," he explains. "The voice-recognition software tailors the spreadsheet program to the human voice."

Making a match

As a speaker provides vocal input—distinctly pronounced words or commands—the input "activates" a part of the program so the computer appears to be responding to verbal instructions. This happens because the software and hardware system together allow the user to record a "voice print" or sampling of necessary words and commands; these can be stored on disk and booted into memory at any time.

The computer uses the "prints" as a template by which to compare any incoming voice signal. In this way, it matches, through a complex series of statistical calculations, the sound of a command it "hears" with the closest sound pattern it has recorded on voice print. When the match is close enough—or if no match occurs—the hardware sends out a signal to the program, which responds either by executing the voice command or ignoring it until an appropriate match is made. Sometimes, this boils down to a user *repeating* a command until the system recognizes the sound as familiar—that is, matching it with the voice print of the command made earlier.

Experts in the field call such a system "speaker-dependent." This means that a specific voice must "train" the system one or more times so that a template can be made. During this process, the computer extracts certain parameters from the human voice—including the unique pattern of "formants," or resonances, in the words we speak (these vary according to the individual)—which then can be used to compare succeeding voice samples.

Another, though less common, form of speech recognition is "speaker-independent." This means that the manufacturer installs the template so that the system can recognize anyone within a large group of people. The most sophisticated systems, however, currently tend to be speaker-dependent, according to Schildt; they offer the most reliable performance.

Generally, such systems require external hardware: a microphone; a plug-in board, which contains a chip to perform real-time voice analysis; an analog-to-digital converter, for converting voice signals into digital information; as well as a software module called the "vocal terminal input/output" (VT I/O). "That module handles all input from the keyboard to the microphone," Schildt explains.

When the system is in operation, a speaker provides input, in the form of sound waves, which are picked up by the microphone. The speech is then encoded and sent to the VT I/O, which, in a kind of feedback loop, returns the signal to the hardware, where it is analyzed and compared to the voice print template. Depending on whether a "match" is made, the hardware sends out an appropriate signal to the VT I/O; the module translates the signal into instructions for the ScratchPad software. In this way, a speaker can say "delete" into the microphone, and find that the command is almost instantaneously executed on the screen.

Are such systems practical? That was my question as I prepared to use ScratchPad with VoiceDrive on an IBM Personal Computer at Supersoft headquarters, with Herb Schildt standing by, giving patient instructions. I was worried, frankly, that this exciting concept might be just a little ahead of the technology to support it.

After all, the version I was to test recognized simple utterances only; that is, words bound by silence, such as "delete," "load," "profits." Streamed speech wasn't possible. Thus, I could tell the computer to "load (pause) profits"—after training it to recognize each separate word—but I couldn't tell it to "please load the profits into the C-12 cell of the spreadsheet."

In this Personal Computer version of ScratchPad with VoiceDrive, my vocabulary was limited to 100 words—a large vocabulary when you think that this is the first voice-driven spreadsheet, but limited in the sense of allowing the user the flexibility to enter large amounts of data and complex commands. The ScratchPad with

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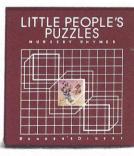
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VoiceDrive manual covers this point by saying voice command is still designed as a "supplement" to the keyboard, not a replacement.

To a large extent, the vocabulary is limited by the on-board memory of the hardware. Reading the manual, for example, I learned that the board can store 100 words, or 8k of memory; this capacity can be upgraded, optionally, to 200 words, or 16k. Still, the PC-Mate Board was not designed to cope with "continuous" or uninterrupted speech. The result, as I tested the product, was that "commanding" the program was somewhat awkward.

But Herb Schildt counters that streamed speech technology *is* available now using ScratchPad with VoiceDrive on the TI Professional System.

Much of the performance quality of VoiceDrive, I learned, depends simply on the quality of the microphone. The better the microphone, the more easily the software and hardware can make "matches" between commands.

Even with all these caveats and limitations, I simply had to take the idea seriously as I started "training" the system to recognize my own voice. There I was, holding a microphone hooked into a back port of an IBM Personal Computer, speaking into it (too loudly), and actually "training" the hardware and software to understand a vocabulary of 100 words—i.e., 100 essential spreadsheet commands and numbers such as "down," "up," "left," "right," "profits," "cancel," "zero," "one," "point," "three," and so on. (The training program, called TRAIN.EXE, is accessed by loading the VoiceDrive disk and typing TRAIN at a systems prompt.)

Schildt informed me that I would need to make at least three "passes"—or repetitions of my words, so that the computer would take an accurate sample. To help me, the screen provided prompts of the necessary words; I didn't have to guess which ones were important. (The program contains a list of acceptable word commands.)

As the screen prompted the word, "Load," for example, it would continue to flash that word until I had pronounced it again in a way that made a "match."

There is a better way

I should mention, however, that there's a far more methodical way of going about this. First, read the Supersoft manual. Don't just jump into "training" as I did. You'll get a far better concept of the spreadsheet and voice-driven capabilities of the program if you follow the manual.

You'll learn, for example, as you read and do the ScratchPad tutorial, that this spreadsheet offers flexible dimensions; it lets you fit the spreadsheet to the application—you can tailor the size of the matrix exactly to your needs. This is done when you execute the program; you simply type the number of rows you want first and then the number of columns.

In addition, the ScratchPad software offers a memory management technique, "virtual memory," as it's called in the Supersoft manual. This lets you enter additional data on your spreadsheet program. The software works so that when you run out of memory as you're entering data on the spreadsheet, ScratchPad automatically begins writing the information onto a disk file. When you need to access it, ScratchPad reads the information off the disk and puts it into a temporary buffer. Instead of seeing the usual screen warning, "Almost Out of Memory," the user will see the program flashing "Using Disk" next to the Ready message. The program automatically stores your data, so you won't have to.

Following the steps outlined in the documentation, you install and test your voice recognition board first. (The board comes with separate instructions.) The hardware parameters are usually preset, and only in special cases do you need to change them. Then you conduct your training sessions and store the voice prints. Those prints that the computer doesn't understand can be done over. Finally, having stored the prints on disk, you can use ScratchPad with VoiceDrive to fill in your spreadsheet.

The format, incidentally, is excellent; at the top of the screen you see a "Formula" line, which contains the label or value of the current unit or "cell" of the spreadsheet you're working on. This is followed by an If/Then function, which shows your assumptions. There is no memory indicator, as a result of the virtual memory technique, but there is a Calc indicator that lets you know if recalculations are occurring after each entry automatically. Below this data is the Command line: You can get help here, exit, or begin your data entry. Below that are the rows and columns of the spreadsheet.
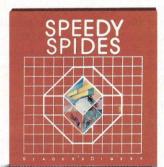
During normal ScratchPad with VoiceDrive operation, you have a choice between a "command" mode or an "entry mode." "Command" accepts voice entries, while entry mode accepts your keyboard data. By typing K, you can switch back and forth from one mode to the other. This is very handy because, as I found out, some commands are easier to say, such as "Save File," while others, such as long numbers (like 3678945.12) are much easier to type out.

Two of these voice recognition hardware systems are now available for ScratchPad with VoiceDrive. The first, designed for the IBM Personal Computer, is PC-Mate Voice Recognition Board, produced by Tecmar, Inc. (Cleveland, Ohio), available separately for $995 or, when purchased with ScratchPad with VoiceDrive, $995 complete. (Scratchpad with VoiceDrive sells separately for $495 retail.) The second, TI's own Speech Command System, is designed for the TI Professional Computer (MS-DOS) with the TMS 320 chip. The price is $2600.

FOR MORE INFORMATION: SUPERSOFT, P.O. Box 1628, Champaign, IL 61820; (217) 359-2112.

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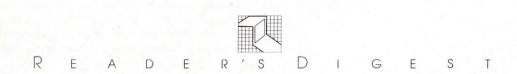
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CIRCLE 70

INDUSTRIAL STRENGTH IN A TRANSPORTABLE PACKAGE

by Lee The', Associate Editor

The Texas Instruments Portable Professional Computer puts all of the computing capabilities of the TI Professional Computer into a sturdy, integrated package that sells for several hundred dollars more than its nonportable predecessor. On the surface, this may not seem to be appealing. But if you need industrial-strength computing power at the end of a carrying handle, this new transportable is a treasure.

TI says the computer is geared toward moderately mobile professionals—especially those with display-intensive applications. It's easy to share a TI computer among several workers, and it can easily fit into the confines of a trailer on a construction site, or on a traveling cart in a classroom, connected to a large separate monitor for group viewing, although it will take up a little bit of desk space, approximately $1\frac{1}{2}'$ by $2'$. It isn't light, either. It can weigh anywhere from 34 to 45 pounds, depending on any options you add—but it does pack up into a suitcase-size box.

Besides being portable, the TI computer is versatile. It comes with MS-DOS 1.25 and 2.1; CP/M 86 and Concurrent CP/M 86, and the UCSD P-System for Pascal enthusiasts; and if you buy the Xedex plug-in board, you can run CP/M 80 programs, too. Languages include BASIC, Pascal, COBOL, FORTRAN, RM COBOL,

TI's Portable Professional Computer boasts high-resolution color, expandability, and over 489 applications programs.

and C-BASIC. For number-crunching enthusiasts, take note that you can use the 8087 math coprocessor in the TI. Software exploiting this chip runs math applications at many times the speed of an unassisted 8088-based machine.

The computer also comes with five expansion slots, so you install mouse hardware and the RAM needed to drive advanced, integrated applications. This is one transportable that can be expanded right up to 768k RAM for constructing huge spreadsheets and data bases, along with using multifunction programs and advanced concepts like mice, voice-actuated interfaces and artificial intelligence interfaces—all of which TI has developed and is making available to software vendors right now.

There are many features that make the TI portable outstanding: high-resolution color, real expandability, a truly superb keyboard with more function keys than a pipe organ, MS-DOS software compatibility, and over 489 applications programs.

Semi-IBM compatibility

If you're looking for IBM compatibility, it isn't as easy as simply inserting an IBM program in the computer and booting it up. The program has to be adapted because the display and keyboard differ, along with some internal details. This could be a problem if the manufacturer were a small operation; but TI has the resources to ensure that most popular IBM programs will be adapted to the TI.

From the time a popular program for the IBM appears, TI estimates it will take about 90 days before the TI version comes out.
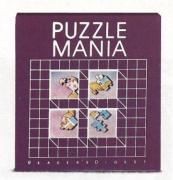
While you need TI and IBM versions of a given program to run it on the respective machines, your data disks (containing your files) will run on both. This means you can create a spreadsheet with your TI portable on Lotus 1-2-3 or a document in, say, WordStar, and hand the disk to an office mate who can read your data on his IBM Personal Computer. TI LAN (Local Area Network) even allows you to plug TIs and IBMs into the same network. It's nice for the computers to be close enough to make program conversion easy for software developers, because that helps ensure a steady flow of programs.

But TI makes a persuasive argument for not going beyond that point: Absolute software compatibility would have limited TI to offering no more than IBM offers. The result is augmented programs like Lotus 1-2-3 for the TI that are file-compatible with the Lotus IBM version. We've also seen WordStar work on it, as well as Professional Software Wordplus with an integrated spelling checker, Microsoft Word, Ashton Tate's dBASE II— even the Lattice C Compiler from Microsoft.

As of the spring 1984, most professionals will find their favorite program already available on TI computers. For instance, you'll be able to choose from between 56 word

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processors, 53 data-base management programs, 42 financial modelers, 18 communications programs, and 14 graphics programs.

Special features

The functionality of the portable's function keys is the result of TIs decision to line them up along the top of the keyboard (instead of clumped on the side as the IBM keyboard does). Because of this, software makers tend to provide a function key label strip that drops in place just above the function key row. As you move from one program to another, you change label strips—and never have to memorize those functions before you can use the software. Because the cursor movement keys don't double as numeric keypad keys (they do on the IBM), you don't have to toggle the key functions in and out of cursor control. So, TI software tends to exploit the cursor keys.

The key layout doesn't match IBM's which is good for touch-typists. The IBM Personal Computer's and copies have a keyboard design touch typists hate (everyone else likes the design just fine, to be fair), especially because of awkward location and design of the Shift and Return.

Best of all, the TI offers a 9″ ultra-sharp color display, which boasts 720 by 300 resolution in both color and monochrome modes. Most other computers 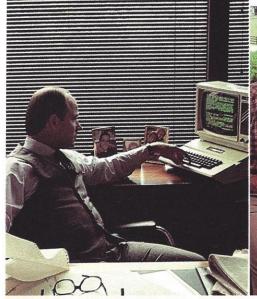have much lower resolution in color than in monochrome. Furthermore, it can show eight colors at once instead of the four found with IBM and IBM-compatible computers. Graphic software exploits this to make complex presentations much clearer. In fact, TI asserts that four-color graphics offers no practical advantage over monochrome graphics using various forms of shading to make four-way discriminations. Only when you get beyond four-way discriminations does color have value beyond pure aesthetics. Seeing the TI display made a believer out of me on this point, and I found the 9″ size was no problem as long as I could place the computer at eye level, and as long as only one person needed to view the screen.

The computer comes standard with a monochrome display, but store salesmen have told me nearly everyone who buys a TI computer gets it with the color display, whether they need it or not—just because it's so delightful to look at. I can believe it. Even in a monochrome-type program like Wordstar you can configure it in two colors. And the glare protection really works—especially important in glare-lit field locations. The resolution will enable you to use some of the new multiwindow programs.

Well designed

The TI portable is well designed. Its fan's audible vigor reflects TI engineering, making sure that no matter how many boards you stuff into its expansion slots, it will be cooled adequately. There's also a little lid on the top which conceals a compartment where the keyboard cable and power cord are stored. A sliding lid beside it reveals the fan exhaust (it goes straight up) and the on/off switch, but you can't slide the lid back over the fan when the machine is turned on, because it hits the on/off switch. How's that for a nice touch?

Two feet in the computer's case swing down to prop the computer and its CRT at a comfortable viewing angle. The keyboard also props up to give you the right angle, with the key plane in a concave curve to fit the sweep of your fingers as you type. The keys have exactly the right feel, down to a detent in the keystroke to let you know just when the key is actuated.

The computer comes standard with 64k and one 320k/360k floppy drive (depending on the operating system software you use). TI was still finalizing its hard disk selection at this writing, and the company is making sure the half-height drive it picks will have the refinements needed to compensate for the notorious physical fragility of Winchester drives. It will be a 10Mbyte model, and will have some kind of design that parks the read/write head out of harm's way during transit.

In the communications area, those who want to play with larger computers will find much to enjoy. Communications software includes 931 Emulation, TTY, 3101, 3276 SNA, 3780, 3278 coax, LAN, and VT100 emulation. The LAN capability comes from 3COM and is Xerox Ethernet protocol-based, but will be sold and supported fully by TI. Low- and high-speed internal modems are also available, so you can travel without the hassle of an external modem.

Texas Instruments priced the portable at $2395 for a single-drive 64k model, but the hardware for a complete workstation could run over $10,000 for a 768k system with 1200 baud modem, LAN interface board, 855 printer and cable. Most buyers' systems will cost somewhere in between.

The first increment for many buyers is the computer with color monitor, which lists for $2965. A second floppy drive costs $475. Prices for the Winchester hard disk were not announced. The 3-plane graphics board costs an additional $325. A plug-in RAM board costs $300 with 64k installed—bringing total RAM to 128k. Two additional RAM packs can be plugged into one RAM board for a total of 192k RAM on the board, 256k for the total system. Each 64k RAM pack costs $165. If you buy the RAM board fully populated you pay $600—a saving of $30 over the plug-in packs. A 300 baud plug-in modem costs $295, while the plug-in 300/1200 baud 103/212 intelligent modem costs $750. A soft carrying case for the computer costs $100.

FOR MORE INFORMATION: TEXAS INSTRUMENTS DATA SYSTEMS GROUP, P.O. Box 402430, H-689, Dallas, TX 75240; (800) 527-3500.

Introducing the MTX 512

A World Apart from the Ordinary.

It begins with the sense of touch.

With the sleek black metal housing. Cool to the touch. Cool to the advanced circuitry and components contained within.

And the solid feel of people-sized keys set up in a field that gives you room to work and space in which to think.

But the difference only begins with what you see and feel. Where it ends...well, that's really up to you.

In a very practical sense, the only limits you'll experience with the MTX512 are those you choose to accept.

64K To 512K RAM – A Look On The Inside

Take a close look at the MTX512.

We could tell you it offers the greatest performance and versatility of any micro in its price range, but we think you're smart enough to draw your own conclusions.

The design is elegant in its simplicity. Remarkable for the power and complexity it represents. 64K RAM built in, with total expansion to 512K. And that doesn't include 16K of video RAM controlled by its own processor.

Speaking of video, keep in mind this is no ordinary monochromatic, single screen system. The MTX starts off where other micros end up. Delivering vivid screen capabilities with 256 x 192 pixels that crisply define interference-free high resolution graphics. 16 brilliant colors that can be displayed simultaneously. In a format powered by 32 easily movable, user-defined graphics characters. Graphics capabilities you'd find impressive in a system that gives you a single screen to work in. With the MTX, you have eight.

Yes, eight.

Eight definable windows to operate independently or in tandem. And still maintain full screen capabilities. Thus, you can manipulate spread sheets on the MTX and see the impact of changing variables in graphics at the same time. Eight separate windows on the world. We call them Virtual Screens. You'll call them extraordinary.

Far from ordinary as well are the built-in system outputs that come standard on the MTX. The Centronics parallel printer port. The two industry-standard joystick ports. The uncommitted parallel I/O port. The Cassette port with 2400 baud. Separate TV and Video Monitor Ports. The 4-channel sound hifi output. We've even installed a ROM cartridge port for word processing and other dedicated programs.

Interactive Languages And Routines – A Look At The Way All Micros Will One Day Perform

Forget the way all other micros perform. This is the way they should.
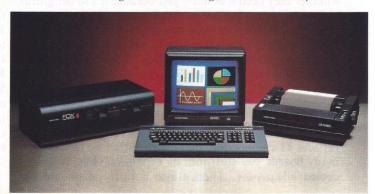
Interactively.

With the MTX, you can create and manipulate programs using four different languages in dynamic interaction, all coordinated through the FRONT PANEL DISPLAY. Interweaving elements as you would in creating a symphony.

And take a serious look at the languages housed in the MTX's 24K ROM. MTX BASIC, a more powerful form of BASIC that allows you to use all standard BASIC programs. MTX GRAPHICS, with straight forward commands, eliminates the tedium and difficulty of creating complex graphics programs. NODDY, an 11-command "easy learn" language that can transform real world programming into a child-friendly activity. And MTX ASSEMBLER, which enables sophisticated programming in assembly language. Something else the advanced programmer will appreciate is our ASSEMBLER/DISASSEMBLER, tied to BASIC, which provides unprecedented display and keyboard access to Z80 CPU storage locations, memory and program.

If you're hungry for more, PASCAL and FORTH are also available as add-on ROM packs.

On the keyboard side of things, you'll find a number of operator-oriented features that speed up and ease up the operation of the MTX. The separate numeric pad with quadri-directional cursor control and full editing functions. The eight dual function keys.

PANASONIC UNVEILS A PORTABLE COMPUTER AND TWO PRINTERS

by Jim Keogh, Associate Editor

Panasonic is making its presence known in the personal-computer market with the introduction of the Senior Partner—a sleek, portable machine that is compatible with the IBM Personal Computer. In addition, Panasonic has introduced two dot-matrix printers that are bound to meet the requirements of even the most demanding personal-computer user.

Although Panasonic has labeled the Senior Partner a portable computer, at 29 pounds it falls more into the transportable category. It comes with 128k RAM, which can be expanded to 512k, and a double-sided, double-density disk drive. Space has already been set aside for another disk drive. This increases the Senior Partner's off-line storage capabilities from 320k (with a single disk drive) to 640k (with two disk drives). In addition, a 9" monitor and thermal printer have been built into the computer's cabinet.

Other standard equipment includes interfaced circuits that allow users to connect the machine to an external printer, modem, or color monitor. These circuits include a Centronics parallel interface I/O port, an RS-232 serial interface port, and an RGB monitor output which allows for built-in color graphics. Panasonic is also bundling the unit with some of the most popular software on the market. Included in the $2495 retail price are WordStar, VisiCalc, PFS:File, PFS:Graph, PFS:Report, and GW BASIC.

The Senior Partner is designed around its own reinforced metal carrying case, which can fit easily under an airplane seat. When the machine is placed on a desk, the detachable keyboard can be snapped off from the cabinet, which exposes the monitor and disk drive.

The keyboard offers 10 programmable (user-defined) function keys, as well as a full numeric keypad. But the keyboard isn't cramped. Instead, it's designed with sufficient space between the keys to facilitate keyboard overlays.

Unfortunately, touch typists may find the keyboard, styled much like the IBM Personal Computer's, a little inconvenient. The Return key is slightly larger than the Return key on the IBM, but even with this improvement, it's difficult to type quickly without mistakes because you must stretch over an additional row of keys to reach the Return key.

Opposite the keyboard on the carrying case is another panel that snaps off, allowing access to the machine's interface ports, power switch, and power cord. Unlike the keyboard cable, the power cord is totally detachable, and is stored in a small compartment just above the interface ports. Unfortunately, when we tried to repack the com-

puter for travel, we had difficulty getting the cord back in its storage space.

When we tested the machine further, though, it was smooth sailing. For example, we tested the company's claim that the Senior Partner is IBM compatible by using Lotus 1-2-3, dBASE II, VisiCalc, and PIE Writer—all of which run on the IBM Personal Computer—and the computer performed flawlessly. During the test, the green phosphor monitor made reading the display comfortable, whether we were working in 40 or 80 characters.

Fast, quiet printing

Unlike the keyboard and monitor, the Senior Partner's printer is stored on top of the computer case toward the

Senior Partner from Panasonic is a portable unit with 128k, a double-density drive, a thermal printer, and bundled software.

back of the machine. Opening two latches allows users to lift open a panel to reveal the printer controls and print head. The printer uses specially treated, rolled paper which is stored inside the computer case. Although the paper holder is a plus, another printer feature is even better: It's fast. In addition, it's quiet—so quiet, in fact, that when it first started running, we thought it hadn't started at all. Another bonus is that the unit can print from 80 to 132 characters per line, making it ideal for hard copies of electronic spreadsheets.

We found only two drawbacks with the printer: It only uses specially treated paper designed for thermal printers, and copy can't be readily seen when the operator sits in front of the computer. The first limitation, the paper, is typical of all thermal printers. Because it uses special paper, office stationery or loose paper can't be used for hard copies. For most users, however, this won't be a major problem, because a higher-quality printer can be

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Friday! is the new electronic file handling system that has become an instant best-seller because it's so revolutionary.

Within two weeks, it broke into the Top 20 on the sales chart of Softsel, one of the country's leading computer software distributors.

And it's now well on its way to the top.

The Friday! phenomenon is simple.

Friday! uses simple menus and talks to you in plain English, so almost anybody can use it.

It's great for sales and commissions, clients and portfolios, mailing lists and labels, invoices, inventories, paychecks, reports and more. And it works with other microcomputer software like 1-2-3™ and dBASE II® (our own advanced database management system).

It comes with a complete, step-by-step tutorial, but you can set up an "electronic file" without even looking at the manual, then use it at the touch of a few keys.

Friday! finds any filed information in seconds. Computes totals, subtotals, commissions, etc. Prints form letters and mailing labels. Gives you quick reports from all or part of a file with a few keystrokes. Or if you need a special report for your bank or board of directors, just "paint" the format on your screen, then have Friday! do all the work.

And while Friday! does more than file handling systems selling for as much as $495, it's yours for just $295 (suggested retail price)!

For more information, contact Ashton-Tate, 10150 West Jefferson Boulevard, Culver City, CA 90230. (800) 437-4329 ext. 206. In Colorado, (303) 799-4900. In the U.K., call (0908) 568866.

Or for the name of your nearest dealer, just call 1-800-4-FRIDAY, ext. 206.

ASHTON·TATE

CIRCLE 9

attached to the computer at one of the interface ports.

As for the positioning of the printer in the carrying case, the operator might find it a little difficult to read printouts while seated in front of the computer. Although a lengthy document will stream from the printer, the last few lines of the document will be hidden by the print mechanism and case. The computer itself is angled so that the monitor and disk drives are positioned directly in front of the operator. Although this may be a little inconvenient, the benefit of always having a printer ready to provide hard copies far outweighs this minor drawback.

The Senior Partner is driven by the 16-bit 8088 microprocessor and is designed to accept the 8087 co-processor, which is available as an option. The Senior Partner has a graphic capability that produces a 640-by-200-pixel resolution on a monochrome monitor, and 320-by-200-pixel resolution on an RGB monitor.

Who is the Senior Partner designed for? Executives at Panasonic have targeted their promotion of the computer to Fortune 1500 corporations, data-processing and MIS executives, as well as small businesses and professionals. But anyone who needs a reliable transportable computer should take a close look at the Senior Partner.

The Senior Partner comes with a one-year limited warranty. Panasonic is also offering computer servicing at either authorized Panasonic computer product dealers or through the company's own factory service network.

Dot-matrix printers, too

Also destined to catch the eyes of personal-computer users are two new Panasonic nine-pin dot-matrix printers: the KX-P1092 and the KX-P1093.

The KX-P1092 prints on both passes of the print head and is capable of printing 180 characters per second. In addition, the unit offers three modes of printing: graphics-, draft-, and correspondence-quality. The graphics mode produces perfect output for charts and graphs while the draft mode gives quick copies of letters and reports for proofreading. With these three printing modes, users can take advantage of the printer's speed for draft copies, and then slow the machine down for near-letter-quality results.

The KX-P1092 handles both single-sheet and tractor-feed continuous paper, in sizes from 4″ to 10″ wide. The printer uses a seamless and endless cartridge ribbon with an ink reservoir, which makes changing ribbons fast and clean. There is no longer a need to thread the printer ribbon manually.

Documents can be printed in either Pica or Elite type styles, or in a mixture of the two, enabling users to highlight words and phrases in a document.

The standard KX-P1092 communicates with any personal computer using a parallel interface. Through an option offered by Panasonic, the printer can also accept

The Panasonic KX-P1093 dot-matrix printer, similar to the KX-P1092, accommodates both tractor- and friction-feed paper.

an RS-232-C serial interface. The KX-P1092 has a retail price of $599.

The second printer introduced by Panasonic, the KX-P1093, is similar to the KX-P1092. It also prints on both passes of the print head and has the three printing modes for graphics-, draft-, or correspondence-quality output. It also has the cartridge ribbon with the ink reservoir.

The KX-P1093 can print at 160 characters per second in the Pica style, and at 135 characters per second using the Elite type style.

The KX-P1093 does offer additional features that enhance the printing operation. For example, it offers bottom paper feed, which is ideal when using bulk paper or continuous labels. It also accommodates both tractor- and friction-feed paper up to 15″ wide.

The KX-P1093, which has a retail price of $899, can connect to either a parallel interface or an RS-232-C serial interface.

You'll find both the KX-P1092 and the KX-P1093 ideal to use with any personal computer.

FOR MORE INFORMATION: PANASONIC, One Panasonic Way, Secaucus, NJ 07094; (201) 348-7183

Panasonic's KX-P1092 dot-matrix unit prints in graphics, draft, and correspondence quality, in Pica and Elite styles.

PRODUCT REVIEWS

AN ACCOUNTING SYSTEM CERTIFIED TO WORK

by Jim Keogh, Associate Editor

Many computerized accounting systems on the market have two major drawbacks: They are difficult to customize for the first-time computer user, and they don't often work as well as their advertising claims suggest. But with The Certified Accounting System from Certified Software, the first-time user need not worry—the system is easy to customize, and it works flawlessly.

The Certified Accounting System is composed of five modules: accounts payable, accounts receivable, general ledger, payroll, and inventory. Each of these modules can be purchased separately, which permits the first-time user to grow into the system without making a large initial financial investment.

What's more, the software system has been certified by Touche Ross & Co., an international accounting firm. Touche Ross reviewed and tested the software, and its findings revealed that the product not only performed according to the manufacturer's instructions, but was in accordance with generally accepted accounting principles and auditing standards.

One of the features of this program is that it's easy to get up and running; after it's been configured to your present accounting system, setup will only take a few hours. Entering data is also easy—just fill out the form that appears on the screen. The cursor is automatically positioned on the line of the form that needs to be completed. Once that line is filled in, the cursor jumps to the next line, and continues moving to the next line until the entire entry is completed. Then, the system automatically stores the information you've input on a disk.

In the accounts payable module of the system, there are three different types of entry forms you can make: a vendor file, an accounts payable activity file, and an accounts payable account file.

In the vendor file you would input information such as the vendor number; his name, address, and phone number; the contact at the vendor's place of business; and the terms offered by the vendor.

In the accounts payable activity file you would keep a record of a single activity with the vendor, typically a purchase. This entry requires that you input information such as the status of the situation, the invoice number, a description of the purchase, the gross amount of the purchase, its discount amount, and its net amount. Also required are the payment due date, the check number, and the distribution charges to various general ledger accounts.

The final entry you would make in this three-part section is in the accounts payable account file. This file handles all the purchases made for the accounting period.

The information you've input in these entry forms can then be used to generate up to nine different reports: audit, cash requirements, unpaid vendors, checks, check register, distribution summary, history, vendor list, and vendor labels.

The audit report shows which invoices have been entered, and checks the accuracy of each entry. The cash requirement report tells you how much cash you'll need when the invoices come due. The unpaid vendors report lists unpaid invoices.

The check report allows you to print checks using pre-printed forms available from local suppliers. Each check then automatically appears in The Certified Accounting System's check register report.

To find out how the accounts payable funds are distributed, you use the distribution summary report, which gives you a synopsis of the dollar amounts to be posted in the various general ledger accounts. If you need a general overview of the activities in the accounts payable area, just use the history report, which lets you glance through each entry for the accounting period.

The entries for the accounts receivable module are similar to the ones found in the accounts payable module, but you'll have to make appropriate changes to reflect, for instance, a receivable function such as credit limits for customers.

You can generate seven reports with this receivable module: journal, ledger, delinquent accounts, distribution summary, customer statements, customer list, and customer labels.

The journal lists all entries made to accounts receivable for the accounting period, while the ledger lists all entries currently on the accounts receivable activity file.

The delinquent account report generates a list of all accounts receivable entries that are past due for each customer. This report provides a fast and easy way to find the customers who owe you money. All you do is activate this report function in the accounts receivable module, and the entire list appears on your computer screen.

The distribution summary report is similar to the one generated by the accounts payable module; it lists the distribution of accounts payable funds for the general ledger. The accounts payable module also generates a statement of account for each customer.

At any time you can even have the computer print out an entire list of customers. This list, similar to the one produced by the accounts receivable module, will contain any or all information about a customer.

The general ledger is also a key module offered by the Certified Accounting System. You'll be required to input information for the accounts file of the general ledger, the general ledger activity file, income statement file, and balance sheet file.

From that information, this module can generate nine different reports: activity by posting, activity journal, trial

At last from a single source:

A system designed for businessmen with big dreams and little cash.

In the past, if you wanted to buy a powerful computer system for your retail business, you had to dig down and come up with a big chunk of cash. Or you had to run around and buy each component separately, which meant if anything went wrong with your system, you had to run around some more to try and get it fixed.

Now, Casio has changed all that.

Now, you can buy a total, affordable system specially designed to help small and medium sized businesses run more efficiently. And you can buy the complete system from a single, dependable supplier.

The Casio Retail Management System is a flexible, programmable system that allows you to convert your daily sales input into instant management reports. Just touch a few buttons, and you can make year-to-date comparisons, monitor sales, check personnel productivity, and control inventory. You'll be able to manage a single register or an entire network of registers within the same store or remote locations using a telephone modem.

The Casio R.M.S. is composed of four main components; a Casio 200SR or 7000SR series cash register, a CPU with typewriter style keyboard, a high resolution CRT screen and floppy disc drive. And the complete system is compatible with most hard copy printers.

There are also many special retail software packages available, such as inventory, payroll and accounts payable. So you'll not only save money with the Casio R.M.S., you'll save yourself a lot of paperwork, and a lot of unnecessary running around.

If you want to discover the true potential of your business, discover Casio. The one retail management system designed for businessmen with big dreams and little cash.

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FINALLY:
ACCOUNTING SOFTWARE THAT WORKS THE WAY YOU WORK.

That's why over 1,000 companies a *week* are putting BOOKS!™ into *their* work.

You get a complete system for automating your General Ledger, Accounts Receivable, and Accounts Payable. (And there are optional modules for Budgeting, Recurring Entries, Invoice Printing, and Checkwriting.)

For the first time, you can computerize with powerful accounting software, *without computerese.* Instead you make entries and review your records using convenient, *ultra fast* onscreen ledgers and journals.

Unlike any other accounting software, all you need is your own understanding of accounting, and a personal computer.

The General Ledger prompts you rapidly through simple or complex journal entries, handles more accounts than you can *ever possibly use,* allows instant adjustments, always maintains full audit trails, and delivers any of a full range of financial reports at any time. (That's for starters.)

The Accounts Receivable handles complete customer detail and totals, prints aging reports the way you like to see them, (open item, balance forward, whatever), and handles ANY NUMBER of Receivable accounts.

The Accounts Receivable also prints an invoice register, customer statements, and keeps a customer listing with shipping and billing information. (That's for starters.)
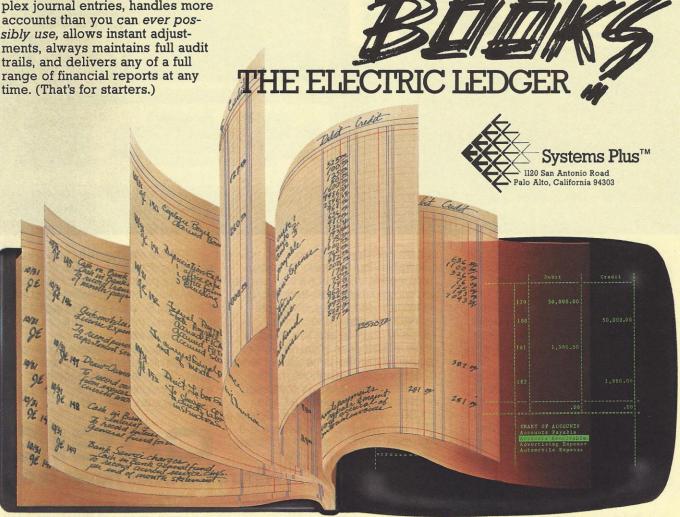
The Accounts Payable prints aging reports the way you like them, prints a check register, gives you vendor totals by month and year, lets you pay on account, by invoice, by partial invoice, or with automated repetitive payment schedules, and will contain ANY NUMBER of Accounts Payable accounts. (That's for starters.)

You get four optional modules that you can review at your convenience, and 'unlock' for full use with a phone purchase from your dealer: BUDGETING, RECURRING ENTRIES, INVOICE PRINTING, and CHECK WRITING. It all adds up to the best investment in your accounting productivity that a software dollar can make.

BOOKS! will run on practically any personal computer you might own or want to own, and can be seen at practically any computer retailer who is serious about selling the best in accounting software.

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balance, account balances, accounts by department, income statement, balance sheet, chart of accounts, and spreadsheet data.

The activity report by posting and the activity journal are similar in that they both print all the entries in the general ledger for the accounting period. They differ in that the activity report lists the activity by posting number while the activity journal lists by general ledger account.

The trial balance lists all the general ledger accounts and their activity during the accounting period. The accounts balances report lists all the accounts that are associated with your company.

The accounts by department report provides a useful means of keeping track of profit centers within your company. This report lets you monitor income and expenses on a departmental profit center basis. This actually allows you to divide your company up into smaller groups, and keep track of each group's performance.

The income statement allows you to review the revenue and expenses of your company, while the balance sheet itemizes your assets and liabilities.

To see what accounts have been set up for your general ledger, you can check the chart of accounts report which lists those accounts.

The final segment of the general ledger reports is one of the most useful in the entire general ledger module. This is the spreadsheet data. This function lets you put general ledger information into many of the popular spreadsheet programs.

The heart of the company

The payroll module offers you more than a simple way of keeping track of how much you pay your employees—it also enables you to keep general employee records. For example, one of the entries you make is called the employee file. This lists the information you would expect to find in a record of your workers. In addition, an electronic time sheet file allows you to keep track of your staff's working schedule.

Also included in the payroll module is a deduction file which allows you to enter deductions that should be made to employees' wages. An accumulate file contains accumulative wages and deductions for the quarter- and the year-to-date.

As with the other modules, the payroll module generates nine reports: payroll distribution, checks, check register, deduction worksheet, accumulations reports, distribution summary, employee roster, employee labels, and quarterly earnings report.

The payroll distribution report is used to verify that payroll information is correct. The module can then write the payroll checks on preprinted forms and electronically keep track of all the checks in a check register report.

The deduction worksheet provides you with an input form from which the computer calculates taxes and deductions. Here you can modify existing records. The accumulations report provides you with both the current and past records of the payroll, which is a good way of double checking that the payroll is correct by comparing the latest payroll against a previous one.

The distribution summary report provides a recap of the payroll entries broken down by department. This is an ideal report if your company operates various departments as profit centers. You can actually keep track of the payroll expenses by departmental profit centers.

The payroll module can also produce a listing of your employees, along with selected information contained in your employee files. Like the other modules, the payroll module can produce mailing labels.

Finally, the quarterly earnings report can be used to generate a listing on a quarter- and year-to-date basis for all wages and deductions.

Keeping an eye on the merchandise

The last module in the Certified Accounting System is inventory. In this module, you first enter information about items contained in inventory in the file portion of the inventory module. This will include such information as the item, its quantity on hand, its usual order quantity, and its reorder inventory level.

Each time there is a movement in inventory, the activity file is filled out. Then, automatically, the program keeps an accurate record of your inventory.

From this information, the inventory module will generate eight different reports: stock status, activity journal, reorder notice, price list, sales by class, sales by item, history by type, and history by item.
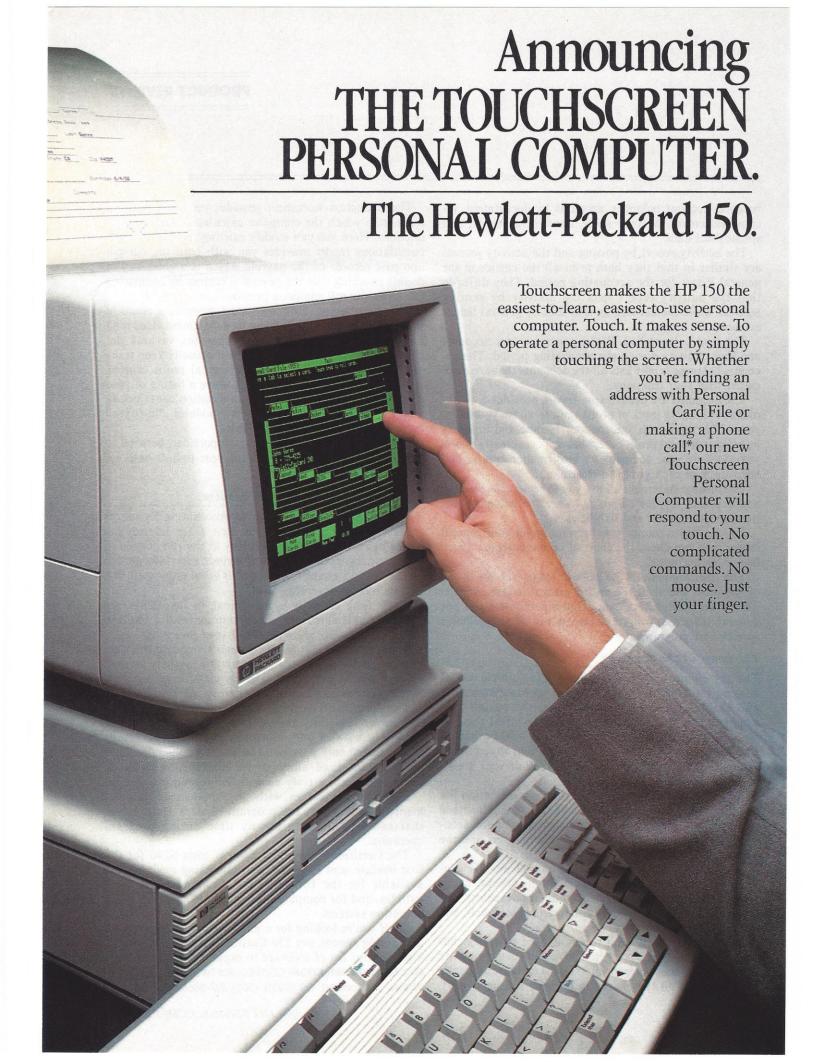
The Certified Accounting System offers the small business owner versatility and power at a reasonable cost. If the business owner only wants to computerize his inventory, he need only purchase the inventory module. Each module can stand alone or be combined with other modules to form a truly customized accounting system.

Each module comes with an easy-to-read tutorial manual. In addition, the program offers a Help option that can be called up at any time during program operation.

The Certified Accounting System costs $240 for the first module, and $195 for each remaining module. It is available for the IBM Personal Computer and compatibles, and for computers using CP/M and CP/M-86 operating systems.

So, if you're looking for a good, flexible computerized accounting system, put The Certified Accounting System high on your list of software to explore.

FOR MORE INFORMATION: CERTIFIED SOFTWARE INC., 9900 S.W Wilshire St., Portland, OR 97225; (503) 297-8666.

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Touch the screen and explore. To change a worksheet, you literally touch the number on the screen or one of the labels appearing on the screen. And that makes VisiCalc® even easier to use. Then use the keyboard for keying-in numbers. All kinds of financial "what-if" problems have never been easier or quicker to solve.

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■**Banking On Computers** ■**The Store Next Door**
■**An Artistic Light** ■**Fireman's Sideline**
■**Career Profile**

Banking On Personal Computers

Impressed by the increasing number of customers owning personal computers, Chemical Bank in New York City and Bank of America in San Francisco are now offering a special service: banking by personal computer. Customers who have computers and modems can call the banks and use their computers to check on accounts, transfer funds from one account to another, and even pay bills.

Chemical Bank's service, called Pronto, has been available to New York metropolitan area bank customers since September 1983. Bank of America's HomeBanking service has been operating in Northern California since November 1983.

Bank of America's service is compatible with virtually any personal computer, says Maury Healy, assistant vice-president of Bank of America. The bank has made arrangements with the Tymnet communications network to carry HomeBanking, which bank customers can subscribe to by calling the local Tymnet number. A customer needs a 300- or 1200-baud modem, but no special software is required.

The service is available to checking account customers for an $8 monthly service charge, from 6 a.m. to mid-

night every day. To use the service, a customer calls the local Tymnet number from anywhere in the United States, and enters several numbers which identify him. This log-on process takes less than one minute, Healy says.

Although HomeBanking has easy log-on procedures, Healy says the bank continually considers possible security risks. "If we didn't think it was safe, we wouldn't have put it on the market," he says. Healy also

"User friendly and secure" is how Chemical Bank's Sergio Sedita describes Pronto, Chemical's bank-at-home system.

claims that there haven't been any security problems with the service so far.

After the security log-on procedures, a menu appears on the customer's computer, asking what the customer wants to do. A customer can transfer funds between accounts, do a checking account review, check on credit card transactions, make inquiries through electronic mail, and pay bills—perhaps the most convenient aspect of the service. Instead of buying stamps, and filling out and mailing payments, customers who use HomeBanking can simply tell the bank to mail out bill payments by keying commands into their computers.

Bank of America has arrangements with 255 payees, including telephone companies, utilities, insurance companies, and major retailers. A customer can pay any of these payees through his computer, and can schedule payments one month in advance. As for paying rent once a month to a landlord or making regular payments to an individual or company not on the list of payees, Bank of America is working on it, says Healy. "If you want to, say, pay a person once a month, that's down the road," he comments. The bank has some property management companies on its list now, making rent payments possible for some customers who rent from large firms.

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Like HomeBanking, Chemical Bank's Pronto system—which costs $12 per month—hooks up through Tymnet. Users must also have a modem and a push-button phone. But unlike HomeBanking, Pronto uses special software, designed to ease log-on procedures and improve security.

Sergio Sedita, a vice-president at Chemical, says, "The aim was to make the system very user-friendly and secure." Through use of the software disk, some log-on procedures are eliminated. To hook up with the bank, the Pronto customer enters the local Tymnet number on the disk, which then dials Tymnet automatically. The customer enters the identification numbers for the bank, and then the software takes over to complete the hookup.

Once hooked up with the bank, the customer gets into his account by using the disk's identification codes, which include a six-digit number unique to the customer and not known by the bank. The customer inputs the number into the software himself, and for increased security, the number never appears on the customer's screen.

Pronto customers can transfer funds, check account balances, do home budgeting, and send electronic mail to the bank or to other Pronto customers. As with HomeBanking, customers can also pay bills.

Chemical has a list of 400-plus payees that customers using Pronto can pay by computer. Payments can be scheduled up to 90 days in advance and cancelled the day before. Repeat payments can also be made, but there are no provisions for landlord payments, and Chemical is hesitant to expand its list of payees to include individual landlords. As Sedita explains, Chemical doesn't think the time and expense are worth it; and, as the payee list extends, so does the chance for fraud.
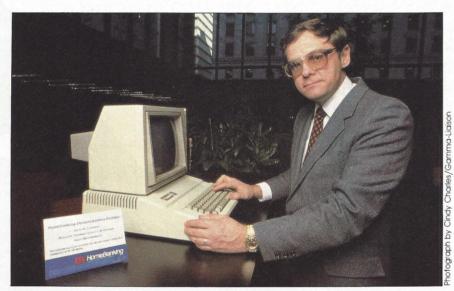
Since there is software involved, compatibility is an issue with the Pronto service. Currently, the service works with Atari computers, the Apple II series of machines, and IBM Personal Computers. The bank plans to expand Pronto's compatibility to cover more machines later this year.

Both Healy and Sedita think the personal computer offers more control, ease of use, and flexibility for banking than simple phone services. With a computer, a customer can bank at odd hours, and can see each transaction, and its effect on his account. Using the computer to communicate instead of just a phone also gives the customer more flexibility. For example, he can get more details on his account, such as what checks have cleared up to that moment.

Of course, HomeBanking or Pronto cannot cover every banking need. For example, initial deposits can only be made by going to the bank, using an automatic teller machine, or having paychecks directly deposited into an account. Likewise, customers who want cash must still make a trip to the bank or to an automatic teller.

Both services are producing positive results. There are now over 4000 customers on-line with Bank of America's HomeBanking, and Bank of America plans to extend its service to the entire state of California in the second quarter of this year.

Bank of America's idea to extend HomeBanking statewide was prompted by research which revealed an estimated 150,000 potential customers for HomeBanking in California. This figure is based on estimates of how many families in California have home computers with modems. Healy points out that people who don't have computers with modems at home may be able to use their personal computers at work

Maury Healy, assistant vice-president of Bank of America, says his bank's Home-Banking service works with any personal computer and doesn't need special software.

to do their banking, which expands the market potential for Home-Banking even further.

Chemical Bank's Sedita is pleased with Pronto's success so far. "Our timing is definitely right; we met all our goals for the year (1983)," he says. Pronto surpassed its stated goal of on-line users by 20 percent, and Sedita says the service provided a lot of visibility for Chemical Bank.

Chemical Bank is doing demonstrations of its Pronto service at major computer retailers such as ComputerLand. The service is only

sold through the bank, but according to Sedita, "We are exploring the possibility of selling the service at the retail level."

Besides offering Pronto to its own customers, Chemical Bank also sells the Pronto service to its franchise banks and to other banks. Eight banks across the country have entered a pilot program using Pronto, and over 20 banks have expressed an interest in buying the service from Chemical.

With these developments in banking by personal computer from major banks, how widespread will this service become, and how rapid will its spread be?

"Home banking will not be a rapid development," says Healy, "though it'll certainly be a part of the bank of the future. Other banks who wish to do this will need to make an investment either in buying a system or in developing one, as we did. Some banks will not be able to make that investment. Banks that can will check out their market areas to see if it's worthwhile." Healy does think his own bank's adoption of such a system "may encourage other banks to get moving."
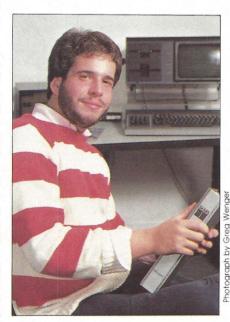
Sedita, however, is confident about the rapid spread of banking by personal computer, and of the growth of home computing in general. "With the current computer explosion, this is an excellent use for home computers," he says. Sedita also says that Pronto will evolve into a full videotext service.

Sedita sees the relation between home-computer sales and home-computer uses as a two-way street; that is, the more legitimate uses are found for home computing, the more people will buy home computers. "Our research indicates people are buying home computers for financial and educational reasons," Sedita says, claiming that the ability to bank at home is one more incentive for people to buy personal computers for use at home.

Advice From A Friend

Steve Laff, a junior at the University of Southern California's film school, began visiting computer stores to find out how one of those mysterious machines might help his aspirations as a screenwriter. What he found instead was that the salespeople trying to sell him a computer knew little or nothing about what they were selling. And after two months of wading through partial answers or no answers at all, he had seen enough.

"They made me feel like I was buying a used car," says Laff, now a senior at USC. "'Oh yeah, it's real easy—take it home,' they told me. Yet they couldn't explain it or show me anything in the store. It was really frustrating."

Rather than shy away from computers as a result of his frustrating experiences, Laff bought a Kaypro II—which he describes as "a good machine at a good price"—and plunged in head first. He locked himself away for about a month and

Steve Laff, owner of Friendly Computers in Santa Monica, believes in offering friendly advice, service—and no pressure.

learned everything he felt he needed to know to teach others what the Kaypro is all about.

He began to do just that less than six months later as a Kaypro dealer, and hired some of the same dissatisfied people he had met at the other stores to help him. Laff's goal: to offer people friendly advice and service—with no pressure. Thus, Friendly Computers was born.

"We talk to you, not at you," says Laff. "We ask you what you want a computer for and what you want it to do. People are surprised when I tell them, 'I don't think you need one,' or 'I don't think you need a computer like this. Get a Commodore.' And they ask, 'Do you carry them?' and when I say no, I tell them where they can get one."
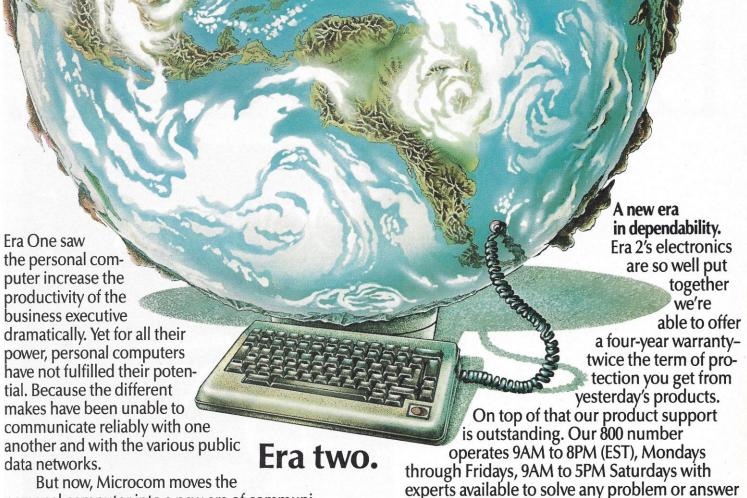
Laff began Friendly Computers in his home, only to find that the business outgrew his quarters quickly. He needed a retail facility with room not only for showing computers, but for classrooms as well since his support for the buyer includes two hours of initial private instruction and four more hours when the customer feels ready for it.

His store in Santa Monica now covers 2000 square feet, with almost half of that area dedicated to classroom space. Classes are offered in everything from beginning computer instruction and software use to theater budgeting and prose writing. A monthly newsletter detailing upcoming events is mailed to all customers. There's also a number customers can call until 11 p.m.

"I knew there were people who were as frustrated as I was. Although I knew I could attract enough people to make it worth my while, I never expected it to grow like it has," says Laff. "Almost everybody who works for me is an ex-customer. I don't have to tell them how to deal with customers because they know—they were customers themselves and went through all these confusing things.

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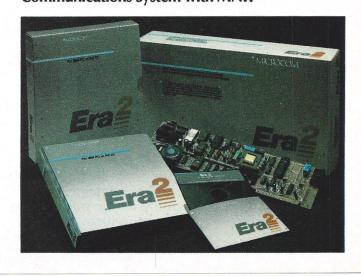
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And everybody who works for me owns a computer, which from what I understand is somewhat rare."

Laff's frustrating experiences at other dealerships gave him a good idea of what he wanted for himself and his staff, which now stands at 12 people. Instead of a high-pressure situation in which the customer's needs are often put aside for the sake of a quick sale, Laff insisted on a relaxed, friendly atmosphere and the follow-up care necessary to get a beginning user on his way.

"It's not hard sell," he insists. "The relationship starts after the sale. Once we get the money it's not 'Thanks, here's your box.' I like to at least have a good feeling about it. If everything (in the store) were priced the same it would be fine. Then we could just get on with our business of helping people improve their efficiency and do the work they want to do—and not have to deal with game-playing and semantics.

"I think the days of consumers walking into the computer store off the street are numbered," he continues. "It's not that these people don't want computers, but for various reasons they're just not coming in. Or they have gone in (to some stores) and didn't like what they saw, so they're just going to wait. These people can use—and in some cases really need—these tools. We're going to pursue these people actively, and let the reputation carry us through."

Laff says he's not sure whether he'll need to expand the store itself or branch out to other stores. As for his personal plans, his love of screen-writing may well end up pulling him out of the computer business within a couple of years, he admits. For now, though, he's content to stick with Friendly Computers—doing business as usual in an unusual way: with people, rather than profit, taking center stage.

"Retailing isn't fun. Taking people's money isn't fun," he says.

"We're looking for more than taking people's money and sending them on their way. What we're really doing is creating a relationship, and relationships aren't formed by pressure. Relationships are earned—they're give and take. I want people coming into my store as they would my house—as a guest. And I want to treat them as a guest. A lot of people who come in here sense that because they've been elsewhere. High-pressure sales are very uncomfortable. I believe that in the long run, we're going to succeed. Any other way is just a bad way to do business."

What does Laff tell his salespeople about those customers who aren't certain what they're looking for? "People come in and say, 'Well, I don't know (what I want).' You can use some closing techniques, per se, but don't sell anybody anything they don't want, because eventually they're going to feel ripped off. I don't want people saying, 'I got ripped off at Friendly Computers.' I want them saying, 'Yeah, it's a nice place.'"

The Technology Behind Creative Expression

Describing a Milton Komisar sculpture is a little like trying to define love: You can string together a million words about it, but they'll never come close to defining the real experience.

Komisar's sculptures are an art form not easily categorized. Called computer-generated light sculptures, they're an eclectic mix of plastic tubes and brightly colored flashing lights that leave you wondering if you haven't perhaps stumbled upon a Disneyland attraction by mistake. The massive structures, some of which fill an entire room, are not simply viewed as one would traditionally admire art; they are walked through and experienced.

It may help you to understand the impact of experiencing such art if you know that when the sculptures are exhibiting in art museums, they are presented in total darkness; art patrons enter a room through a curtain, and close the curtain behind them. Pulses of brilliant colors flash into the darkness, illuminating the roller coaster-like tubes for a few seconds, then shutting off, leaving the impression the structure has faded off, too. A curved, 9' high form, looking like a large graduated mass of fishbones, hangs in a linear pattern on the other side of the sculpture, flashing light in all sorts of patterns. On another part of the sculpture, brightly colored starbursts explode on and off repeatedly; then yet another section illumines. This display of light lasts from 12 to 55 minutes, depending on the sculpture. Then the cycle begins again.

Beating in almost eerie accompaniment are background sounds which seem more like science fiction special effects than music to appreciate art by. Komisar calls them "basic electric sounds." "It's not music, and people expect music, not sound, to go with light."

The structures are built of plexiglass rods and bulb-like polyhedra, which are many sided figures that Komisar calls "pods." Inside each of the pods is a tiny 12 volt light bulb—the sculpture's source of light. The brilliant colors come from colored inks—the same type found in magic markers—which Komisar applies to either the bulbs, the tip of the rods, or both.

The design of each sculpture is pure Komisar, but at the controls of the artwork's lights and sounds is an Apple II Plus. Electrical wires inside the rods invisibly connect the sculpture to the Apple which, based on programs written by Komisar and programming collaborator Michael O'Malley, directs each light bulb to go on and off at the appropriate time.

Such variables as the speed of the light, which direction the light goes, and how it will interact with other light patterns can all be controlled.
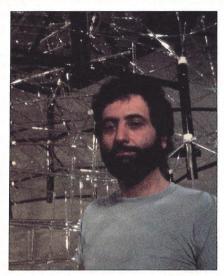
As the light is thrown from the pod down through the rod, it creates an illusion for the spectator that he or she is watching light travel through space. "The computer is an extension of the sculpture," Komisar explains. "It's as much a part of the sculpture as the structure is. The computer allows time and movement into the piece. It becomes more alive, and loses its object-ness."

The sound of the piece is achieved by using a General Instruments sound effects card which, Komisar says, allows him to program a whole range of sounds into the software, even manipulating them to slow down and change tones.

Komisar first started combining his art with computers in 1974, using an Altair with 28k memory he bought through the mail. Later, he moved on to a personal computer from Sol Processor Technology and, since 1981, has been using three Apple II Plus's with 64k memory, which Apple donated for his work.

A resident of Oakland, Calif., Komisar says his work is a direct result of the electric/electronic society in which he lives. The technology all around, he explains, gives people a base from which to understand his art. "The sculptures are very much like getting in your car at night and taking a drive through the city. The signals move; the street lights move; the tail lights move. If I lived out in the country, I couldn't do this kind of work."

That technological base gives Komisar not only the creative inspiration for his work, but also provides him with the tool to make it happen: the computer. "I moved from a three-dimensional medium—sculpture—to a four-dimensional medium, by adding the element of time. I needed to project into these three-dimensional structures a complex

Milton Komisar and one of his massive light sculptures, illuminated and accompanied by sound via an Apple II.

range of four-dimensional images. A computer is perfect for doing that."

As for the programming involved, Komisar admits he's no expert. He's just learned as much as he needs to make the computer do what he wants. "I think computers get real scary if you don't know what to do with them. But the minute you know what you're after, you can focus in on what you need to make it happen. You don't need to understand how the computer works, just how it affects you. Not realizing that is a great mistake people make when they confront a new technology.

"I knew just what I wanted to do," he continues. "I'm interested in my *personal* use for the technology. Using the computer creates more and more individuality," he says, "more and more personal expression. No one else knows how to do my sculptures but me. It's the farthest extension of personal computing you can think of."

The end result is not an "object," Komisar insists, but rather "It's an enormous range of images. All the images add up to the image of the sculpture."

He likens his sculptures to knowing

someone well. "You don't have a one-dimensional view of them (people). Same with the sculptures. It's better to think of them in a multifaceted way."

Though his first sculpture took two years to complete, now, Komisar says, he can turn around and build one in much less time. Using patterns of light sequences he and O'Malley have already programmed for other sculptures, Komisar can change and combine them to get a jump on his next piece.

Though it takes less time than ever for Komisar to create a sculpture, there is still an inherent drawback to his chosen medium: the temporary nature of his creation. Once the museum exhibit for which the sculpture is made is over, Komisar has to dismantle the piece, as he dismantles all his work that isn't permanently shown. It's a lot of effort to put in, only to have to take it apart.

"It's a very common instinct in us to nurture things, make things happen," Komisar says softly. "This is my way of bringing something to the world. This is what I have to offer."

A Fireman's Hot Sideline

Never yell, "Software!" in a crowded firehouse—at least when Dennis Jarvis is around.

Jarvis is a 44-year-old fireman with the Los Angeles fire department, charged with the duty of driving the hook and ladder truck. Nothing particularly unusual about that, right? Well, that's not all he does. When he's not driving the truck, Jarvis is developing software, and now heads his own software development and consultation company.

How does an L.A. fireman with no computer training go from putting out fires to putting out software, as

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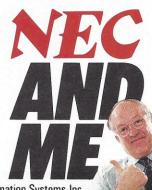
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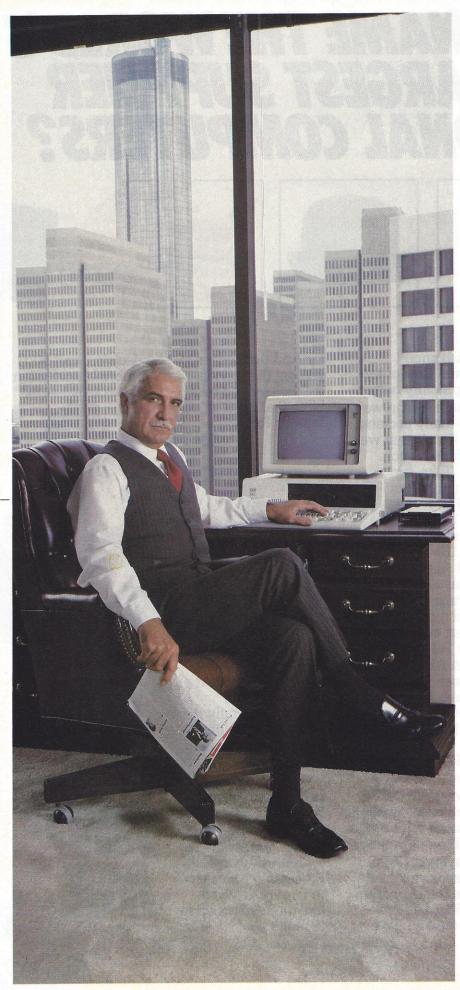
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CIRCLE 85

CIRCLE 92

well? With a strong interest, a bit of common sense, and some unexpected free time.

Jarvis's interest in personal computers and software began heating up at about the same time many other people became interested in computers: when Apple first introduced the concept of personal computing to the world at large in the mid-70s. Then, in 1977, he suddenly had the time to pursue his budding interest in computers. While helping to extinguish a house fire, Jarvis fell from a porch and seriously injured his left knee. Corrective surgery was necessary, and Jarvis found himself at home in Simi Valley, Calif., (about 20 miles west of L.A.) for three months with a cast which extended from his hip to his ankle.

Despite having only one year as a math major at an L.A. city college under his belt, Jarvis took the fact that he was "always interested in math and science" and applied that interest to learning more about personal computers.
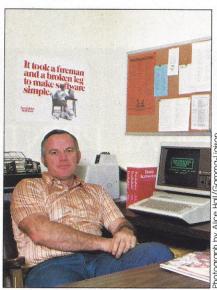
"During the time I was recuperating from the surgery, I started reading a few books about personal computers," Jarvis recalls. "There weren't very many computer books or stores or anything else around at the time, so I really had to scratch to find something like that. But I didn't have a lot to do, so I nosed around one day (on crutches) and bought a couple of books. That helped to further develop my initial interest, and then I started occasionally going over to the local Apple dealer and asking a thousand questions. About six months after I was back on duty, I finally decided to plunk down the money and buy one."

The computer he bought was an Apple II which, at the time, was only available with integer BASIC and a cassette drive. His interest in computers soon translated into an interest in programming when he read a few how-to programming guides, and discovered he might be able to produce better, more useful software than he

was buying off the retailer's shelf.

"I purchased a cassette-based checkbook program . . . and in using that program, I found it was so terrible—or at least not what I thought it should be—that I thought, 'Why don't I try to improve on it?' And that's what really got me started in the line of programming," says Jarvis. "Once I found out that I could do a little programming, I just decided to start building a program that would fit my needs."

Once disk drives became available for the Apple, Jarvis's programming efforts began to take a more serious

Dennis Jarvis, a Los Angeles fireman, puts out fires—and software. He uses an Apple IIe in his new software firm.
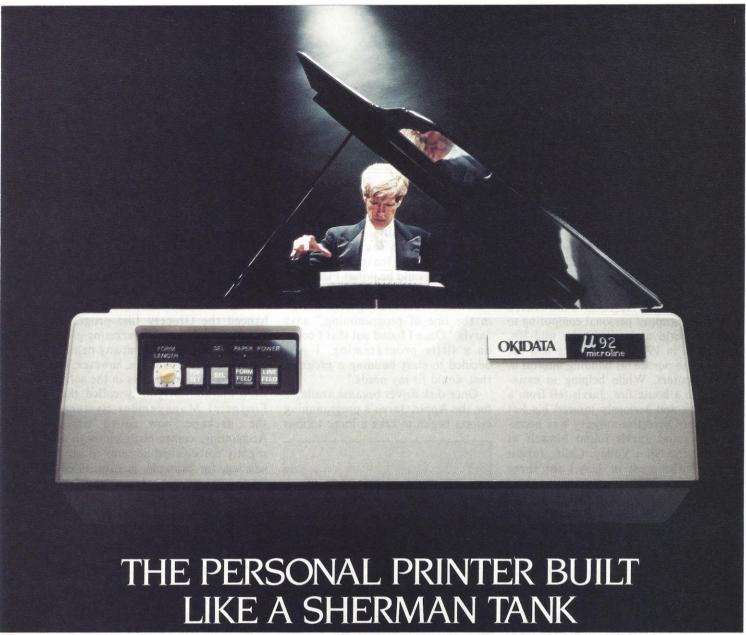
shape. His first commercial endeavor was a package for the Apple called Grocery List, a food shopping list program which he now markets through his own company, Computerized Management Systems, Inc. The Grocery List software, like many of his other programs to date, was born as a practical solution to a common problem—in this case, food shopping.

"During my recovery, I had occasion to do the shopping several times because my wife was working," he

explains, ". . . and when you're on crutches, you find that if you're not familiar with the store, you end up chasing things all over the store because you forgot something. So this program kind of rang a little bell."

After picking up a few early sales in local computer shops, Jarvis enhanced the Grocery List program and began a full-scale marketing program under his new company name. His most recent package, however, is easily his biggest success in the software market. Originally called the Financial Management System, the package, now called Basic Accounting, comes complete with a slightly embellished account (a broken leg, for example, is substituted for the less dramatic knee injury) of how Jarvis came to combine the unlikely pair of fire fighting and software developing. Basic Accounting, which runs on Apple and Atari models, is also available for the IBM Personal Computer in a version called Electronic Checkbook. So, how does a fireman who writes software come up with an accounting package for home and small business use?

"I approached it from a user's point of view," he insists. "Although I've done a considerable amount of reading as to how accounting works, I've never really taken any courses in accounting. But I do know what tools are necessary for the average person to balance his checkbook, and that type of operation each month. Then, through the business I've developed, I also have pretty good insight as to what tools are necessary to keep your small business going."

True to form, Jarvis's home-accounting package originated not from a thorough scanning of the marketplace for a product niche, but rather from a very close-to-home, practical need. Dissatisfied with that first cassette-based checkbook program, and needing something to keep his household finances in order, he set out to develop a simple but effective

way of using a personal computer to see where the money was going and why. What he came up with is a very basic system of positive and negative numbers which requires no knowledge of accounting theory on the part of the user.

Jarvis feels the Basic Accounting package will convince anyone who will sit still long enough to give it a try that "fireman and programmer" isn't such an unusual combination after all. "I think it's safe to assume no one will ever again say to me, 'Dennis, you don't know anything about computer software—you're a fireman.'"

But, Jarvis admits, the transition from full-time fireman to full-time fireman and part-time software developer is a tricky one, and one which he did not exactly orchestrate every step of the way.

"If five or six years ago, you'd told me that I'd be doing this sort of thing today, I would have doubted it," he says. "But it just seemed a sort of natural way to go."

Does he have any trouble keeping his two careers separate? Not at all, says Jarvis. "When I'm on duty I'm a fireman," he continues, although noting that he now enjoys writing software at least as much as going down to the fire station.

A Career Profile Of Computer Professionals

How satisfied is a systems analyst with his job? What are the career goals of a data-processing consultant? What does a computer programmer do with his leisure time?

The answers to these questions are of keen interest to anyone thinking of becoming a computer professional. But where do you find the answers? Through U.S. Department of Labor statistics? From Department of Commerce figures? Not likely. You

may find out approximately how many people work in the computer field, and maybe their average salary range and level of education, but things like job satisfaction and leisure time just aren't there.

This gap in career counseling information—a gap which represents the more human aspects of career choices—has been addressed by a familiar source of career profiles: Dewar's. Over 60 magazine advertisements for Dewar's "White Label" scotch whiskey have featured brief career profiles of typically young, successful individuals, and the profiles have since become associated exclusively with the product. The profiles have focused on the hobbies and preferences of the people in the ads, rather than on statistical information. Of course, the individuals all share a taste for Dewar's scotch.

Out of this advertising campaign, and as an extension of it, came The Dewar's Center for Career Development. The Center was established by the Schenley Imports Company, which imports and markets Dewar's products in the U.S. The first major project undertaken by the Dewar's Center, which is less than a year old, is a series of booklets called *The Dewar's Profiles of Americans at Work*, which was designed to give career seekers a peek into the more human, less tangible aspects of employment in particular fields.

The series, which covers "the emerging professions of the eighties" and is distributed to over 1000 colleges and universities, is largely the brainchild of Graham Walsh, vice-president of marketing at Schenley Imports in New York. Walsh sees the *Profiles* as a unique supplement to the voluminous amount of career information already available.

"There's a ton of information (about careers) around, but it tends to be quantitative and pretty dry," says Walsh. "We thought it would be interesting to do some research among a diverse group of people in a

particular career area, and look at the research not only . . . quantitatively, but also on a qualitative level. We want to share with the rest of the world what it literally feels like to work in a certain career, to share with other people how the reality of working in the computer field, for example, measures up to what their expectations were while they were in college."

The Dewar's Career Profile of Computer Professionals is the first booklet in the series. The 76-page profile focuses on six types of computer professionals: educators, systems analysts, computer programmers, data-processing consultants, entrepreneurs, and computer sales or marketing personnel. The information in the booklet, which is sprinkled with quotes, sketches, and graphs, is based on surveys conducted by the research firm of Research & Forecasts, Inc., with the aid of computer professionals themselves.

The computer field was a natural first choice for the *Profiles* series, according to Walsh. "It's an area in which a growing segment and an increasingly diverse, heterogeneous band of the population is becoming very, very interested," Walsh points out. "It's also an area that represents tremendous growth potential in terms of the number of positions that are going to be available over the next few years. And even for people who might not be terribly interested in changing their careers, there's still a kind of curiosity about what it's like to work with these strange machines—at least to someone who does something more conventional for a living.

"We feel there are a great deal of inaccurate preconceptions about what it's like to work in the computer field," he continues. "People have a pretty strong sense of what it's like to be a stockbroker or banker—whether they're right or not is another issue. But that's not the case when you're talking about systems

A personal computer without the PersonalFeeder is like Mr. Laurel without Mr. Hardy.

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analysts. What do they do all day? There are an awful lot of people out there who don't have a clue."

To help take some of the mystery out of what it's like to be a computer professional, the *Profile on Computer Professionals* covers topics like work satisfaction, personal motivation, aspirations and expectations, the work environment, leisure time, views on the path to success, observations on people and opportunities in the field, and advice to prospective job seekers. The material is the result of telephone interviews with 301 computer professionals.
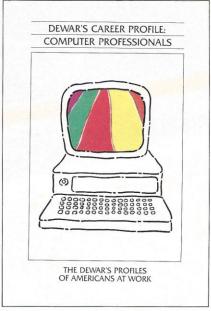
Although Walsh stresses the qualitative level of the series, much of what is discussed in the above topics takes the form of easy-to-read charts and graphs. In other words, human, qualitative reflections are transformed into statistical data, expressed mostly in percentages. But the survey results, mixed with artwork and quotes from some of the professionals polled, are readable and informative. Many of the findings also seem to give strong signals about the nature of the computer field.

In a composite profile of the six types of computer professionals, for example, the survey found that 70 percent of the people polled termed their positions "very satisfying." Only 6 percent found their work "not very satisfying" or "very dissatisfying." A large majority, 82 percent, said they had gone either "as far as expected" or "even further along" in their careers. In the complaint department, the clear winner was paperwork; 42 percent of the people polled ranked it as their primary beef. Pressure and/or long hours came in second at 12 percent.

The *Profile* also indicates that computer professionals may be largely satisfied with their work for internal or personal reasons. Strong personal interests and personal growth were the highest rated motivational factors, while being creative and learning new skills were

listed as their work's biggest rewards.

Some of the survey findings apparently contradict, or at least temper, a number of stereotypes associated with people who work with computers, while other findings seem to support a few. For instance, leisure activity was given a high priority by the computer professionals, and only 35 percent of their leisure activities involved computers. More than four out of five people (82 percent) also said that their studies outside computer science and math were valuable

DEWAR'S CAREER PROFILE:
COMPUTER PROFESSIONALS

THE DEWAR'S PROFILES
OF AMERICANS AT WORK

The *Dewar's Career Profile: Computer Professionals* gives you a peek into the human aspects of a career in computers.

to their success in the field, with most of them citing English language skills as "very important." Other findings were more predictable: Almost all of the professionals received college training of some sort; most were math, computer science, or engineering majors; three-quarters work more than 40 hours a week; and most describe their work environment as at least "moderately hectic or intense."

As for the future, nearly all the professionals agree that the greatest opportunities will exist in data pro-

cessing, with programming/software development offering the best job potential within that field. And almost all of them agree that opportunities in the computer field for women and minorities will be good.

The last section of *The Dewar's Profile of Computer Professionals* attempts to round out what it calls the necessarily "impersonal quality" of the survey's statistical information with eight individual profiles written by computer professionals themselves. The profiles detail how they got started in the field, what turns their careers have taken, and the kind of life-styles they now pursue.

Dave Bechtel, director of the Career Development and Placement Center at the University of Illinois's Urbana-Champaign campus, serves as one of six advisors to the Dewar's Center. He sees the *Profiles* series as an especially good way of helping college students decide on a career.

"The college campuses are in some ways isolated from the real world, in the sense that the grapevine kinds of information are harder to get to," says Bechtel. "This is a means, in trying to do a profile, of writing down the kind of information that might in fact be on the grapevine—the sharing of the personality . . . of a profession with someone who might be considering that profession.

"What the profiles do that nothing else seems to do," he adds, "is to actually survey people in the field and ask them for information that goes beyond a simple description of the occupation—information that adds to the fabric by which individual students who are in the process of making career decisions can begin to make some judgments."
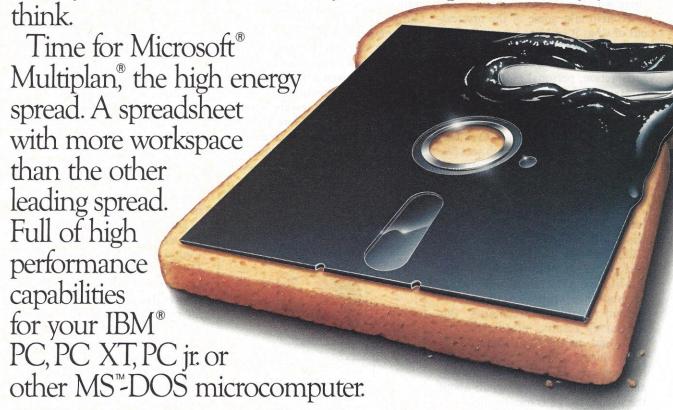
If you don't have access to a college career office, or can't find the computer profile booklet at your school, a copy can be obtained by sending $1 (for postage and handling) to: The Dewar's Center for Career Development, Suite 1100, 110 E. 59 St., New York, NY 10022.

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CIRCLE 31

High-Powered Presentation Graphics

Advanced graphics software can turn your business presentation into a work of art

by Charles Rubin, Associate Editor

Remember what it was like to do a simple pie or bar chart before the days of personal computer graphics? If you were lucky, you had an art department who would take your sheet of figures with instructions about the kind of chart you wanted, and give you a finished chart a day or two later. Maybe the title wasn't exactly where you wanted it, or the colors weren't quite what you had in mind, but there wasn't time to do it over before the presentation that afternoon. If you weren't lucky enough to have an art department, you trotted out your compass and pencil and graph paper, and you drew, and erased, and drew, and shaded, and typed, and cut and pasted until you ended up with a graph which, while not perfect, was, well, good enough.

That's all ancient history, of course, because these days we have business graphics programs for our personal computers. The two-day wait to get a graph from the art department has been reduced to a five-minute process with a computer and plotter or printer, and the smudged, cut, pasted five-hour labor of love has become a flawless, three-color, 3-D masterpiece created with a few keystrokes.

Everyone agrees that business graphics software is a giant step toward more effective communication through visual images, but it's

only a step. It's great that your computer can plot your data and insert it into a report, but when it comes to designing a sales form, or an office layout, or a new logo, or a flowchart, where are you? Back with the pencil and paper or the art department, that's where. That is, that's where you would have been until now.

During the past year or so, a new breed of graphics software and hard-

When Mindset held an open house to show off the Mindset computer to employees and their families, a guest used the computer to create this scene.

ware has sprung up that promises a permanent end to pencil-and-paper drawings of every kind. Thanks to high-resolution color displays, 16-bit processors, and flexible input devices like the mouse, individual computer users can now have shapes, colors, and even animation capabilities that were formerly available only on dedicated graphics systems costing upwards of $100,000. With an in-

vestment of as little as $3000, you can now have a hardware/software graphics system that will faithfully reproduce almost any shape or object you can imagine and will fulfill your creative design needs.

This year should see a quantum leap in the importance of graphics as thousands of users put these new tools to use in countless ways, changing computer graphics from a limited matter of pie and bar charts into a generic application. It's easy to imagine replacing current pencil-and-paper tasks like forms design or drafting with such a capability, but imagine words with visuals. A paragraph describing a new product package becomes a drawing; a convoluted explanation of your new marketing plan is enhanced with a freehand sketch. The possibilities are staggering.

The key elements behind the growing use of high-powered graphics are price, flexibility, and ease of use. We see computer graphics all the time on television, but these are generated on systems costing megabucks, and such systems require weeks or months of training to use. There have also been industrial CAD (Computer-Aided Design) systems used in the design of circuits, buildings, machine parts, and other items, but again, these are priced in the six-figure range.

Low-cost graphics programs have been available for personal com-

puters for years, but they have largely been limited to specific pie, bar, or line graph generation. A couple of years ago, CAD software for personal computers began to emerge. Initially, it was priced at $1000 to $2000, and required a computer graphics tablet on which the user actually drew the image. Graphics tablets cost from $750 up, so you had to figure on adding at least $2000 to the price of your personal computer if you wanted some graphics flexibility, and that didn't count what you'd pay for an output device like a plotter or printer.

Power for personal computers

Early in 1983, the necessary elements for powerful personal computer graphics began to come together in Apple Computer's Lisa, which offered considerable graphics power in its LisaDraw program, and used a mouse pointing device instead of an expensive graphics tablet. This system has had a limited number of customers because of its initial $10,000 price tag, but it has nevertheless sparked a flurry of graphics-oriented innovation. Last year also saw the introduction of powerful graphics programs for the IBM Personal Computer, which allowed users to draw lines or shapes in a variety of colors using either a light pen, graphics tablet, or the cursor control keys on the IBM keyboard.

Now, 1984 looks to be the year of the big graphics explosion because the promising developments of last year are being built upon, yielding products that are less expensive and easier to use. Lisa now sells for under $7000, and has been joined by the $2500 Macintosh, which offers similar graphics capabilities in its MacPaint program. The IBM programs are being upgraded to allow use of the relatively inexpensive mouse pointing devices (they cost about $300) instead of the more cumbersome cursor keys or more expensive graphics tablet. Last year's $1000 programs are this year's $495
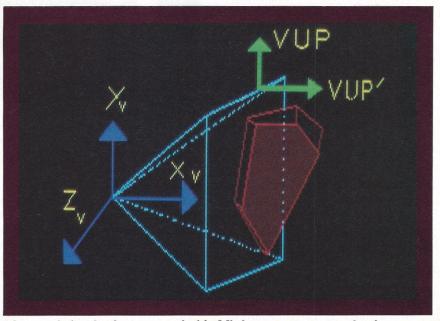
or $595 programs, which is sure to expand their audience.

It's easy to understand the explosion in the use of graphics once you use one of these products. With the software loaded into the computer and your hand on the mouse, you're free to let your imagination soar. If you want to draw a circle, you select the circle shape from a menu and draw it. You click a mouse button to select the center of the circle, and then move the mouse pointer away from the center. As you do, a perfect circle grows out radially from the center point. The farther you move the pointer, the bigger the circle. When it's the size you want, you click the button again and the circle solidifies. You do the same thing if you want an oval, or a square or rectangle. Select straight lines, and you can draw a polygon or connect other objects. Select an arc, and you can draw perfect curves. If you don't want to be perfect, you can select a freehand mode and draw any sort of line or object you want. Everywhere you move the mouse pointer, a line or object appears. If you want to

fill in an object, you can select one of several colors or patterns from a menu. If you don't like the location of an object, you can move it. If you want to duplicate a circle or other object exactly, you can copy it. If it took you a long time to create and you want to keep it to use again, you can save it to a file and recall it later to insert it into a larger drawing. It's picture processing instead of word processing; instead of having a fixed set of characters or pictures, you can create any image you want.

Some of the first people to take advantage of advanced graphics power were managers in companies who received Lisa computers for evaluation and testing. Two such companies were Martin-Marietta and McKesson Drug Company.

At Martin-Marietta Aerospace in Denver, Colorado, the software engineering team uses several Lisa systems for a variety of graphics tasks. According to departmental staff engineer Jerry Simonson, the graphics systems have paid off in a number of ways. Staff drawing time is reduced, illustrations are finding

After you design the shape you need with Mindset, you can rotate the shape to see various angles and dimensions.

their way into more documents and presentations for improved communications, and there's a substantial cost savings over the large-scale CAD/CAM system the department also uses. While software engineers aren't involved in the drafting-intensive work of mechanical or electrical engineers, they do use block diagrams and flowcharts to visualize the programs they're working on.

"Before we got the Lisa systems," Simonson says, "we used to send out diagrams to the art department, or do them on a big CAD/CAM system. We allocate our costs for expensive equipment to individual departments," he says, "and with our $500,000 CAD/CAM system, we figured flow diagrams were costing about $200 a page to produce."

With several software engineers doing flow diagrams constantly, the costs added up quickly. The introduction of Lisas into the department quickly converted the engineers from the CAD/CAM system. With the Lisa and an Apple dot-matrix printer, flow diagrams can be produced at a fraction of the cost. Now

that the Lisa systems are available, some of the engineers haven't used the CAD/CAM system in months. Ease of use is an important feature that allows users of all levels to get up on the system quickly. "We had a new person," Simonson says, "and we showed him the Lisa system on a Friday night. He came in and played with it on Saturday, and did 10 or 12 viewgraphs for a meeting on Tuesday."
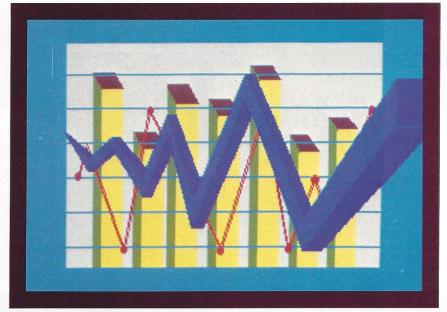
Show vs. tell

In addition to block and flow diagrams that are photocopied for distribution or made into transparencies for overhead projection at meetings, the department also uses LisaDraw to create organizational charts and timelines. These documents are stored on the Lisa, and when changes are made it's easy to recall the file and edit the chart. With the organizational charts, for example, individual boxes can simply be moved to new locations during a reorganization.

The power of graphics to make a point has been shown again and again

in the department. For example, Simonson says, "I was doing facilities planning for some of our software engineers. We wanted to partition everybody in their own space to give them more privacy. We were going back and forth with the facilities people about how big each space should be, and I finally sat down and drew the desk, table, and computer terminal in each module to scale so they could see how a 6' x 8' cubicle wasn't big enough. It was amazing how easily they could see the problem once I showed the graphic. Otherwise, I could have spent quite a few days or months arguing, and they probably would have gone ahead and committed to a smaller space."

And the power isn't limited to charts or diagrams, either. "Some of our needs are really simple," Simonson points out, "but you need graphics ability to do them. Sometimes we just need big letters or big numbers to make a sign. You can't do that with an ordinary word processor."

Simonson feels that graphics capability lets him tailor the appearance of his information for maximum impact on a particular audience. "Years ago, I used to work for a vice-president here who was formerly a stress engineer, and once a month I would have to present our manpower planning for the last year by department, and our forecast for next year, all in graphic form. I'd present this to him on an $8\frac{1}{2}''$ x 11'' piece of paper. We had about 6000 people, so that makes for a lot of very thin, squiggly lines. I always wondered how he could understand that graphic, and wondered why I couldn't give it to him in numbers. When I presented the same information to the finance people, they always wanted to see the numbers. What I gradually learned was that engineers get so accustomed to working with lines, charts, and graphs, that they don't really like working with numbers, and that financial

Using the various functions of Mindset, you can draw objects and have them move in front of other objects, such as in this 3-dimensional bar chart.

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"It takes forever to draw boxes by hand, but with Lisa, you make one box and duplicate it."

PERSONAL PRODUCTIVITY

people don't like working with charts—they'd rather have the numbers. So now, I present data both ways."

Personal graphics systems have been warmly received throughout the company. "I'm enthusiastic about the whole concept of the users having this kind of control," Simonson says.

Lisa typesetting

As the editor of sales publications for McKesson Drug Company in San Francisco, Leslie Mastalarz is responsible for creating three regular sales-oriented publications as well as various forms for the sales force. The use of Lisa computers and LisaDraw in the office has brought about significant changes in the way things are done.

"We have a separate department that designs forms," she says, "but when we have a new sales program and we want to develop a new form for it, it needs to be tested and refined in the field. It's not worth it to typeset the initial form, because you can end up paying for typesetting several times as the form changes. Traditionally, we've been making up forms on a typewriter and using them for a month or two, and then taking them to the forms management group. Now, we do it on Lisa and we can create the actual form."

The Lisa is connected to both an Apple dot-matrix printer and a daisy-wheel printer, and the output is good enough to be used as camera-ready artwork when forms are finalized and printed. "When we did the first form on Lisa, I did it because it was easier to show exactly what I wanted to our forms people rather than giving them a description. When I was done I decided it looked good enough to send right to the field. The people in the field thought it had been typeset and printed."

As with word processing, one big computer advantage in graphics applications is the ability to cut and paste parts of drawings. When de-

signing multipart forms, for example, where the only difference is the foot title that designates the head office copy or the salesman's copy, Mastalarz stores the titles separately and then pastes them into the main form one at a time for printing. The cut and paste feature is also making it possible for Mastalarz to enhance forms in ways that were previously impossible. "We always thought it would be nice to do flashier an-

nouncements or memos, and now we're doing it. I wanted something in two colors recently. Without this system, the cost of the typesetting alone would have been prohibitive. With the cut and paste feature on Lisa, I could hold back an area of the document and then paste it back in to form the whole thing. Each area became one of the two color separations, and I could print them up separately to give to the printer, so we

GETTING THE GRAPHICS OUT

All this talk about eye-popping graphics for personal computers inevitably leads to the question of how you generate hard copy of the images on your computer screen. These days, it might take longer to reproduce graphics than it did to create them in the first place, and the output bottleneck could dampen the enthusiasm of would-be Leonardos. Mindset vice-president Bruce Irvine doesn't see it that way, though. "A lot of users are only looking for screen graphics," he says. "It's the same as spreadsheets. How many spreadsheets do you see printed out in proportion to the number of spreadsheet software users? If someone needs to distribute a series of graphics, he can distribute the diskette they're stored on. For presentation in meetings, our frame storer will let people use the computer like a slide projector. Take a storyboard, for example. Why take the time to print it out when somebody can flip from one frame to the next on the computer itself?"

Irvine also points out that plotter and printer technology is on a fast track, and will soon result in products that offer fast, high-quality output at reasonable prices. In the case of Apple's Lisa, camera-ready quality output is already available in a system that links a Lisa to a Compugraphic typesetter. The Personal Composition System, as it is called, consists of a fully bundled Lisa computer (the six standard Lisa applications and the hard disk are included), plus special

software that translates the Lisa's normal formatting commands so a Compugraphic typesetter can understand them. The special Lisa system is available through Compugraphic Corporation of Wilmington, Mass. for $13,995.

According to Mike Malcuit, a sales consultant for Compugraphic, the new system is revolutionary because it eliminates the dozens of typesetting codes other typesetting systems use, and it lets users print out camera-ready type or illustrations directly from the Lisa. "Anything you can create on the Lisa screen can be reproduced," he says, "and the user doesn't have to know anything about typesetting." In addition to reproducing the Lisa's text and graphics with far higher quality, the Compugraphic system also has speedier output. Compared with a text-only output of roughly 60 lines per minute on a dot-matrix printer, the Compugraphic system can crank out hard copy at about 500 lines per minute.

Malcuit says that with Compugraphic's popular model 8400 typesetter, a complete composition and typesetting system could be had for about $40,000. "The amazing thing is that it will produce graphs or free-hand illustrations as well as text. I don't know of another typesetting system for under $100,000 that will produce graphics." If a customer already owns a Lisa computer, Malcuit adds, the software and documentation for the Personal Composition System cost $5800 in single quantities, "and the price drops dramatically with volume purchases."

" *A process that might have taken 80 hours by hand would only take about half as long with CADPLAN.* **"**
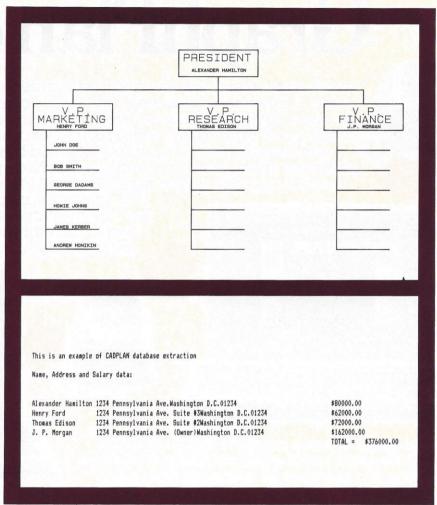
saved money there, too." The printer then used each section of the flyer as the camera-ready art for each separation, instead of having to make the separation himself.

"Since we're computerized," Mastalarz says, "a lot of our forms have to have card-entry formats, with lots of little boxes for individual letters. It takes forever to draw all those little boxes by hand, but with Lisa, you make one little box, and then you duplicate it." The Lisa has a background grid that can be turned on or off to assure accurate spacing and overall measurements. "When you've duplicated the second box and you move it into place, Lisa remembers where you wanted it in relation to the first box, and after that, you can do 50 or 60 boxes all in a row. On the next row, you copy a box from the row above, and you can do another row."

Mastalarz is looking forward to the arrival of a Compugraphic typesetting system that uses Lisa as an input terminal. Once the system is installed, she'll never have to go outside the department for typesetting again. (See box, p.69) The company is also giving a lot of thought to buying Macintosh computers for secretaries and clerks. "We've actually held off replacing some typewriters in this department. It makes sense to put a $2500 Macintosh on a secretary's desk instead of a $1500 or $2000 typewriter."

IBM graphics

While Lisa's hardware/software combination was the first easy-to-use advanced graphics system to become widely available, a host of new software packages for the IBM Personal Computer are showing up that offer as much, if not more functionality. One such system is CADPLAN from Personal CAD Systems in Los Gatos, California. CADPLAN offers Lisa's drawing flexibility and a lot of other features that will appeal particularly to industrial designers and architects.

Top: With CADPLAN, you can design any type of drawing you like, such as this organizational chart. Bottom: CADPLAN features a data-base extraction option that allows you to store data linked to various parts of the drawing you do.

Unlike Lisa, the scale grid on CADPLAN can be set to a specific scale, and the program automatically keeps track of the distances between various points. It also offers 128 different pen sizes and three fill colors. A CADPLAN drawing can occupy a grid of 60,000 dots by 60,000 dots, so that on a scale where the distance between individual dots was one inch, a drawing could be a square mile in size. Drawings can be done on up to 50 different levels (an architect, for example, would put walls on one level and plumbing on another), and parts of the drawing can be linked to a built-in data base. Designers and architects can store the cost of individual desks in offices on a floorplan that can be stored in the data base, and areas of the drawing can be isolated for total costs of furniture, wiring, light fixtures, or whatever. But Personal CAD Systems president Richard Nedbal believes CAD shouldn't be limited to use by architects and designers.

"What we want to do," he says, "is to bring CAD to the masses with a product that's easy to use, cheap to buy, and yet offers most of the function of systems costing a hundred

❝Sometimes we just need to make a sign. You can't do that with an ordinary word processor.❞

times as much. Sure," he says, "you can use CADPLAN to do architectural drafting, but you can use it for a lot of other things, too. Let's say you want to build a fence in your yard. You decide you want to use 1″ x 8″ lumber, and the fence will be 40 feet long. With CADPLAN, you could draw one piece of lumber and tell it to iterate that piece for 30 feet, and then get a data base extraction that would tell you how much lumber you'd need and what it would cost."

Nedbal goes on to suggest other household uses like figuring the exact amount of paint, wallpaper, carpet, or linoleum needed when remodeling. "Interior designers can use it to try various room layouts with different pieces of furniture," he says. By accessing the furniture costs and vendor names stored in the data base, the designer could instantly determine the total cost of each layout variation. In business situations, the graphics and data-base capabilities could be used to create organizational charts, where information about the employees in the chart could be stored in the data base. This would make it easy, for example, to isolate a certain department on the chart and quickly retrieve the total of salaries for people in the department from the data base. Other business uses include form or publication layouts, enhanced business graphics, space plans, package designs, and logos.

At Ford Aerospace in Sunnyvale, Calif., CADPLAN has found many of the uses Nedbal suggests. According to Marvin Scriber, supervisor of Program Support Systems there, "We use it for just about everything you can think of—organizational charts, engineering sketches, block diagrams. Normally, when an engineer sends a hand-drawn sketch to the draftsman, a lot of human error gets into it because of penmanship. CADPLAN helps the engineer give a clean copy to the draftsman." At this point, the engineers use CADPLAN and a Houston Instruments plotter to

create clean drawings, but draftsmen are still required to input that drawing into a mainframe drafting system costing several hundred thousand dollars for production of the final drawings. Ford is working on an interface that will allow the engineers to take CADPLAN files and feed them directly into the larger system.

What-if drawings

Scriber uses CADPLAN for organizational charts and block diagrams to do what-if drawings for the global satellite control networks Ford designs and builds for the military. The block diagrams are done on the systems level, so that individual components such as receivers and transmitters are shown in locations all over the world. Some of the drawings are a dozen feet on a side, and contain hundreds of objects. Instead of the large pieces of paper on a drafting table, the work area is the computer screen, and the pencil is a mouse or a graphics tablet. Scriber works on one area of the drawing at a time, and then pans across it to another area, or uses a CADPLAN function called Fit that zooms out to show the entire drawing. Many parts are so detailed that when the whole drawing is viewed, a receiver or other component that has lettering in it will appear only as a tiny box on the screen.

"It takes some getting used to, working with only one part of the drawing at once instead of the whole thing on a big piece of paper," Scriber says, "but once you do it's no problem. You zoom in on small portions as you work on them. With CADPLAN, I can be working on a small part of a drawing and be interrupted, and then come back and forget where I am in the drawing. Then I use the Fit command and it will always bring me back to the overall picture."

CADPLAN's major impact in the department is time savings. "Before," Scriber says, "we had a junior engi-

neer on a drafting table doing block diagrams. He'd send them out to various people, and they'd send the drawing back with changes. Then he'd have to go in by hand and erase the drawing and make the changes. Sometimes the same drawing would go back and forth so many times that the engineer actually wore holes in the paper from erasing it. With this, he can draw it out, put it on the plotter, send it out, get the changes back, and replot the drawing. A process that might have taken 80 hours by hand would only take about half as long with CADPLAN."

Another way CADPLAN speeds up the drawing process is by allowing the designer to assign symbols to frequently used objects and store those symbols in the computer. When he begins drawing each day, Scriber can load a group of symbols into the computer's memory and then copy them into the drawing as he needs them.

Copies of CADPLAN are spreading throughout Ford Aerospace, and Scriber expects its uses to multiply as it works its way into different departments. He doesn't use CADPLAN's data-base extraction feature because his drawings don't require it, but he can foresee facilities planners making good use of it to plan quantities of conduit, pipe, and other materials when building.

There are a number of other firms producing advanced graphics software for the IBM Personal Computer and its compatibles, including IMSI Software Publishers in San Rafael, whose 4-Point Graphics has been popular and will soon be upgraded to allow input by mouse instead of cursor-control keys, and Personal CAD Systems has recently released CADDRAFT, a cheaper version of CADPLAN that offers only eight drawing levels and doesn't have data-base extraction capabilities. In addition, the industry's growing belief in the importance of business graphics has influenced the design of a new IBM-compatible

The number of uses for graphics will skyrocket when users experiment with its capabilities.

computer. Offered by a new company called Mindset in Sunnyvale, California, the new computer is an effort, in the words of company president Roger Badertscher, "to offer a state-of-the-art product with superior graphics capabilities for the retail market. We wanted to create a computer with graphics functions optimized for the new graphics-oriented software."

The Mindset computer features a separate, custom VLSI graphics chip and the Intel 80186 processor. Graphics functions are controlled through special input/output routines stored in the computer's ROM. The computer is designed to run the IBM software under MS-DOS (Mindset says it is at least as compatible as the Compaq), but it has considerable graphics power available for software developers who want to take advantage of it.

"We think of graphics as the next generic application," Badertscher says. "Spreadsheets have driven the market until now, but with the new visual interfaces like Microsoft Windows, and the use of mouse pointing devices to issue commands, people are thinking more visually." Mindset won't be in the software business, but it will supply three third-party graphics programs. The most expensive package is a product called Lumena Graphics, which was developed by Time Arts, Inc., of Santa Rosa, California.

Time Arts is a supplier of computer production graphics systems for commercial artists in ad agencies and video production houses. Their systems (which include a computer, graphics tablet, and graphics software) range in price from $9600 to $25,000. According to Jerry Droll, president of Time Arts, the Lumena Graphics system on the Mindset computer offers capabilities similar to Time Arts's own System 2, which sells for $9600. The System 2 is designed for presentation graphics, art and production graphics, and limited

2-D commercial animation. It can display up to 16 colors on the screen simultaneously with a resolution of 640 x 482 dots. It offers 4096 possible colors.

By comparison, the Lumena Graphics package on the Mindset costs less than $500, displays 16 colors on the screen simultaneously, and offers screen resolution of 320 x 200 dots. With a single-drive version of the computer itself selling for around $2000, this means that some extraordinary graphics capabilities will be available for under $4000, including a plotter or printer to reproduce the images. One of the lower-priced graphics programs being offered for the Mindset is an enhanced version of 4-Point Graphics.

One revolutionary feature of the Mindset computer is an animation capability that makes it possible to control the movement of up to 200 objects on the screen at once. "The animation is very smooth and clean," says John Dunn, vice-president of software for Time Arts.

Using the graphics input/output routines in the Mindset's ROM, software developers can produce ellipses, circles, boxes, polygons, and lines, and control the movement of objects on the screen simultaneously. These capabilities make it far easier for developers to create graphically rich programs for the consumer market.

Other forward-looking features of the Mindset computer are its ability to create and store videotext frames and output them using the North American Presentation Level Protocol Standard (NAPLPS). NAPLPS is the agreed-upon communications protocol that current videotext experiments in America are using, and will likely be the standard protocol for sending and receiving videotext images when these services become widespread. Mindset allows users to receive as well as send videotext images—text, graphics, and even sound—without modification. It is the only personal computer with this

capability, and will give its users a jump on other computer users, who will have to buy a separate videotext converter to use such a service. The frame-storing function can also be used to produce and display "slide shows" of a series of images.

But you could know nothing about the computer at all and still be amazed at the stunning quality of its graphics. Mindset had an open house recently for families of its employees, and had the computer set up in the room. Without any prompting or assistance, people walked up to the computer and began drawing things with the simple graphics editor that was loaded. One guest created an elaborate farmyard scene that is now used as part of the product's demonstration. Mindset vice-president of software development Bruce Irvine uses the open house experience as proof that the company is on the right track with the new graphics wave. "If people will take something that you're giving away, then they'll buy it," he says. "It's just a matter of figuring out how much to charge."

Endless potential

When you begin to consider the potential use of graphics in business it becomes obvious that the range of possibilities is very wide indeed. In a way, the current state of advanced graphics can be likened to the early months of electronic spreadsheets. At first, spreadsheets were used to replace the specific manual tasks of budgeting or forecasting, just as the first advanced graphics tools are replacing manual forms design or drafting. But as spreadsheets moved across the country, the number of uses skyrocketed when users experimented with the capability. Powerful graphics capability is here today, and with the advent of more highly integrated software that will allow merging of any graphic image with a text file, the promise of pictures for changing our notions about written communication will be realized.

How a Remarkable Software Package Helps Get Projects Done On Time

The Harvard Project Manager™ — a software breakthrough that makes effective project planning and management easier than ever

Display from Harvard Project Manager. Top, Roadmap shows what depends on what. Below, Schedule shows timing of tasks and milestones.

For years, managers who run big aerospace and construction projects have used *critical path* planning methods because they know that time is money. Now the *Harvard Project Manager (HPM™)* makes critical path planning so easy you can use it for *any* project, large or small. HPM turns your IBM or compatible personal computer into a powerful tool for *getting things done.*
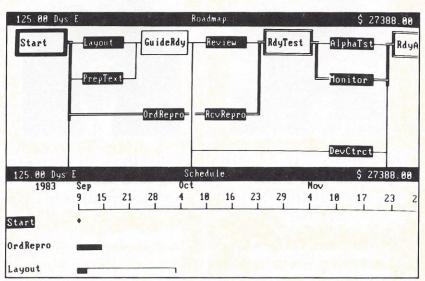
You work with pictures

As you enter elements of your project (*tasks* and *milestones*) HPM draws a diagram. This *Roadmap* shows at a glance which steps come first and which ones follow, and how you can save time by running tasks in parallel.

> "Harvard Project Manager may be to critical path planning what VisiCalc has become to spreadsheets."
> *Personal Computing*, Sept. 1983

"What if" capability

Add or delete tasks, move them around, or make any changes you like. The Roadmap display instantly updates your project and highlights the critical path. You see the latest computed time and cost, so you can try out several strategies *before* spending any money.

Scheduling and Tracking

At any time, you can also see a graphical *Schedule* of your work. Horizontal bars show tasks against a time line, with slack periods clearly depicted. The Roadmap shows you the *shape* of your project, and the Schedule shows you the *timing*. Multiple windows let you make changes in the roadmap, and watch the effect in the Schedule.

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You can use your dot matrix printer to get printouts of HPM's graphic displays (sideways if you like) or detailed management reports. HPM can even print a personalized list of "things to do". Customers tell us their HPM printouts are their best tools to communicate project information to associates.

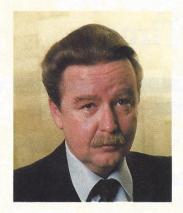And there is a lot more HPM can do. Like calendars, fast and easy menus, on-line help, and more. You need to see the Harvard Project Manager in action to fully understand its value.

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Telecommuting: The Home-To-Office Link

Add your telephone to a modem and a personal computer and you can tie the office to your home

by Arielle Emmett, Contributing Editor

It was fantasy, lovely fantasy: working at home, full- or part-time, but reaping all the benefits of a secure law firm partnership. Wasn't it the next rung up for an independent man, one who knew himself, his staff, and the best conditions and hours to perform his job?

To Thomas L. Irwin, a New Jersey attorney, the thought involved some risk, but he enjoyed risk. If he could make it work, connecting a workstation from his home in Glen Rock to his law suite in Montclair, roughly 35 minute's commute south, he might, at least, get away with avoiding the car hop to the office on weekends. Besides, working at home might provide the right "environment for the mind" he had longed for, being a writer of poetry, a top-notch court-room performer, and indexer of 15,000 pieces of detail concerning personal injury cases.

Three years ago, Irwin, a partner in the New Jersey firm of McGlynn, Reed, Hense, Picora, & Irwin, decided to recatalogue and condense some 550 active legal files on computers in his office and home. To start the job, he chose a Radio Shack Model II—one for home, and later, one for the office. Eventually, he added other computers, peripherals, and connecting hardware. But his first task was to sift through massive amounts of paper records—primarily a task he took on at home—trans-ferring them to a workable data base, with cross-referencing capabilities, on floppy disks. "I distrust paper," Irwin says. "Give me two pieces of paper and I'll make three . . . or three thousand. . . . Give me a machine, though, and I'll do anything not to have to repeat the same task twice."

That was Irwin's first home/office connection: He bought compatible computers, converted files to disk, and shuttled them back and forth from home to office. At the time, Irwin was struggling just to get an understanding of how to organize on computer—how to merge documents, file, how to index locations, complaints, and so on, using Radio Shack's Scripsit word processor, Profile Plus, and other software packages. He *hadn't* thought about how far those computing connections could take him. But he intuited—correctly, he believes now—that if he could only get out from under the paper, mastering the computer instead, then the electronic process would eventually become so transparent to him that the details of *the cases themselves* would "sing out." "Reality," in his words, "would become enlarged." And he'd become an even better courtroom attorney.

That was the rationale, anyway. Irwin, a self-confessed dreamer, says that rationale helped him get the home/office connection working. It wasn't easy, he concedes. "I learned how to use computing by doing it all wrong. . . . What I've found, I've found from being wrong." Yet Irwin's instincts and persistence have paid off. For the first time, he reports, he's able to communicate with clients and "craft" a case through sheer exhaustive scholarship—the ability to use a computer to instantaneously record, check, compare, and reindex thousands of details and depositions, to see what inconsistencies or truths might turn up. He even maintains a "lie" index on disk.

In the courtroom, he uses a Radio Shack TRS-80 Model 100 portable as an information retrieval tool. Before trial, he writes what-if scenarios on the portable, showing him a chain of events as he expects them to happen. Carrying the computer into the courtroom, he keeps it on his table as a reference device, later jotting down notes he will download, using an RS-232 interface cable, to his disk files on the Model II. "Generally I write the summation of the case first," he says. "That solves a lot of problems" in organizing facts and arguments.

Irwin admits he's been reluctant thus far to bring the computer itself to the bench or to the jury, though he has indeed brought forward his computer-based notes. He's worried about starting a "one-upmanship" feud in the courtroom, in which the computers are used by each lawyer

to dazzle and finesse a jury. Still, he concedes, "It's only one more step to take the computer from the table to the jury." He's cognizant of the possibilities.

Your expectations?

All right, who is Tom Irwin? At this point in the story, I'm supposed to tell you: "Tom Irwin isn't unique. He's one among tens of thousands of people trying the home/office computing connection. You, too, can make the connection. All you need is a personal computer, a home office, an office office, a modem, a communications package, and the ability to make a million." Something like that.

Well, first of all, Irwin *is* unique. He may not be the first to carve out a working computer niche at home, but he is probably among the first to translate an encyclopedia of his cognitive life into a workable data base available on 8″ floppies. Something like that.

What I'm trying to say is that each computing solution ought to be unique, like the person who makes it. When deciding about whether or not

to try a home office, connected to an office office or not, it's probably best not to follow Tom Irwin, but to follow your heart.
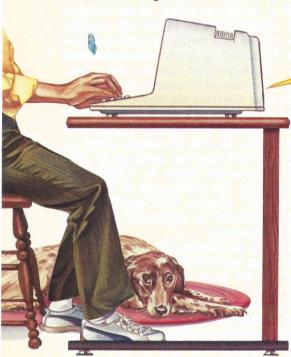
Not that your heart is always educated to the facts of the matter. But instincts, combined with education, can result in wonderful things. For example, there's a Ph.D. candidate in computer science I've interviewed, George Stephen Hirst, of the University of Iowa, who probably couldn't have survived, at least in the ways we want to—much less made himself and his family happy—had it not been for some fairly sophisticated home/office computer connections he made with the goodwill of his employer.

To be specific, four years ago, Hirst, about to become a father, was working as a programmer and project analyst for Conduit, a software publishing house based on campus. He was busy translating and enhancing 10 software packages for the Apple, adding graphics and so forth, when he realized that his wife Donna would probably like some help with the new baby.

Hirst's solution at the time was, in his words, to "break down and enter

computer—an Apple IIe, with a 300-baud Hayes Micromodem II (Hayes has since updated Micromodem II to Micromodem IIe, retailing at $329, with touch tone and pulse dialing features) and a terminal communications package to go along with it. This time, the rationale was to allow Donna, a technical services librarian, to do nighttime homework for her university computer courses. With a second child having arrived, it wasn't possible to go zipping back and forth to the university computer center at night, so Donna began using the modem to get into the university minicomputer over the phone lines, and Steve, again, started working seriously at home. This time he was preparing for his Ph.D. exams and also downloading office files he wrote and stored on a campus mainframe.

To get into it, he booted the terminal program on the Apple, dialed the local access number with the modem, then logged on, entering the appropriate passwords and ID, then responding to a computer prompt by typing WCC (abbreviation for Weeg Computer Center). Once in terminal

the personal-computer age." With Conduit's blessing, he brought an Apple into his house, kept one at the office, and arranged to work half-time in each place for six months, minding his infant son and dropping floppies in his briefcase. That was, indeed, a pretty simple connection—disk to disk, Apple to Apple—but it did give the Hirsts the ability to manage a new family and to work at the same time, though Steve eventually returned the computer to the office and started working there again full-time.

A year and a half ago, though, the Hirsts went out and bought their own

mode, Hirst's computer captured the data as it printed and stored it on disk as a text file, so he could later polish it with a word-processing package.

"The mainframe executed the program as though it were printing to a terminal," Hirst explains. In fact, terminal emulation with data capture capability is a common communications mode for personal computers these days. But even this relatively simple mode allowed Steve to do work he couldn't do before from home. To Steve and Donna, the modem link came just at the right time. The moral? No two computing situations are alike. It was right for

Steve to borrow when he did; it was right for him to buy when he did. Only the individual can establish how far the links should go, and when to make them.

Sterling examples

Having cited these two cases, I could go on and list half a dozen more. There are, indeed, tens of thousands more, because suddenly the computer has made the home/office connection a dazzling possibility—especially for "knowledge" or "information" workers who make their money primarily pushing the contents of their minds, as opposed to some physical material.

According to statistics cited by a number of experts I spoke with, including Jack Nilles, a senior research associate at the University of Southern California, people who "telecommute" with electronic devices from their homes may number as high as 20,000 today; those figures may soar to 13 million by the end of this century. "The energy savings (in gasoline, light, and other commuting and office costs) will be considerable,"

says Nilles, the Director of Information Technology Programs at the University's Center for Futures Research. If 13 million workers do stay at home, full- or part-time (Nilles estimates only 3 million or so would work full-time at home), then the United States will no longer need to import oil for gasoline, he asserts.

The only thing that might slow the trend is "human nature. You know, fear of change," he says. "Some managers—if they can't see their workers (visually), they get nervous immediately about whether they're working or not. To them, the fact that you're working at home is *nice*, but—"

The "but" is a big one, and may be responsible—much more than any backwardism or unfamiliarity with the technology itself—for the surprisingly *low* increase in the numbers of telecommuters at present, according to Nilles. Still, many companies are doing it on a "trial" or experimental basis. They include NYNEX (the recently formed New York/New England phone company amalgam), Control Data Corporation, American Express, Manufacturers Hanover, New York Life, Blue Cross/Blue Shield in South Carolina, Continental Bank in Illinois, and a number of smaller companies, according to Nilles.

At NYNEX, for example, Frank Knight, manager of Telecommuting, a four-year-old project, says 18 company people are working at home three or four days a week, on average, telecommuting to New York corporate offices with voice and data links. Those numbers should go up to three or four dozen within a few months, Knight reports; thus far the program straddles "all kinds of job classifications"—anyone from representatives in the legal department to marketing staff. All of them spend

some time at corporate offices and many, like Knight, travel. At home, though, their offices are equipped with sophisticated phone and data equipment to keep lines of communication open. Conference calls and call waiting and forwarding are among those features used: If, for example, a client or potential customer dials the Manhattan number of the home worker, the phone automatically forwards the call to the home.

In addition, the telecommuters do their writing, text editing, and electronic mail on personal computers and some terminals; these include four or five Apple IIe's, a new set of

Wang PCs, Texas Instruments's silent 700 portable (a dumb terminal and printer transmitting via phone links at 300 baud), Northern Telecom Display Phones (which transmit voice and data at 300 baud, with a built-in modem in the unit), as well as four or five Radio Shack Model 100s, which have become so popular, Knight reports, that they're "winding up being a pooled device," especially for the more mobile NYNEX executives who hold meetings in remote sites.

How well does the system work? Knight says it works beautifully. "Mostly it's a two or three day a week at home thing for me. It varies with the job, though." Like other employees, Knight has set up an arrangement that's satisfying to him; he sets his own hours, and the company pays for the equipment, phone calls, and all telecommunications costs, while he (and other NYNEX telecommuters) provides his own space, and foots the bill for files and electricity. Says Knight: "It works out very well. There's no 'typical' day."

For him, days start somewhere between 6:30 and 7 a.m. in his West-

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chester County (N.Y.) home. Before his small children get up, Knight spends an hour or two working; he collects his electronic messages— NYNEX uses a Western Electric 3B20 UNIX-based electronic· mail system set up within the company. Having received his messages, either on a Display Phone or his TRS-80 Model 100, Knight composes any necessary letters or memos and plans his day. For about an hour and a half, from 8 a.m. to 9:30 or so, he attends to his children, has breakfast, etc., until a babysitter comes in for roughly five hours each day. Meanwhile, both he and his wife Lucia work (she is also a NYNEX telecommuter; they arrange their commuting so one parent can stay at home while the other is traveling or at corporate headquarters), until the "edge of nap time." Then there's the "dinner phase." And Knight goes back to work again for a couple of hours until bedtime. He also puts in some additional hours on Saturday mornings and Sunday nights.

Is this the ideal life? The most productive? Like many telecommuters, Knight is quick to point out the immediate benefits: double the productivity, he asserts, based on logs of his own project performance he kept during his first year as a telecommuter. In addition, as much as 20 hours a week of commuting—potentially productive time—is reclaimed. Telecommuting at NYNEX is also clearly the way for dual wage earners and disabled employees, he adds, citing the example of one worker able to do data-base management at home while recovering from minor surgery. "People who'd otherwise be lost to the company can keep working," he says. Knight believes it is only a matter of time—when data gathering and research is complete—before

Although attorney Tom Irwin has never actually brought his portable computer to the judge's bench, he does use it in the courtroom to retrieve information.
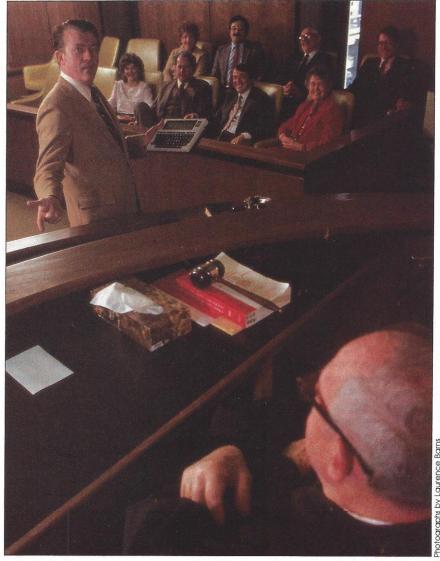
the company engages thousands and thousands of workers on a flexible telecommuting basis. "Telecommuting means not being 100 percent locked into the house," he says. "It's got to apply to the individual circumstance."

The ideal telecommuter

Circumstances aside, can *anyone* do it, though? No, according to Nilles and several other experts I interviewed. The ideal telecommuter has to be autonomous, self-disciplined, and "inner directed," Nilles says. By

contrast, "the ideal non-telecommuter needs extra prodding all the time," with a manager breathing heavily over his right shoulder.

In addition, non-telecommuters tend to crave social contacts at the office, "schmoozing" at the water cooler, and longer lunches. At home, they usually can't get away from the children, the refrigerator, or the postman. These people, Nilles suggests, probably ought to stuff the idea of a home office into the bucket.

But wait a minute. Nilles and Knight have been talking primarily

Photographs by Laurence Barns

about "company" people; that is, people who make their money for large or smaller corporations on a salary basis. What about people who want to make a home/office connection when they work for themselves? Plenty of these people abound—everyone's ideal is to work "at home," or for oneself at least, as a "consultant," writing off a third of the house, all the office supplies, all the relevant (and some irrelevant) travel, paying oneself handsome commissions and charging a fortune to client companies. Yes, that's the ideal. And several independent consultants I've talked to, many of whom establish a rather complex home/office connection by keeping their primary workstation at home, and connecting to *it* remotely, say it really can work. "But you have to remember," cautions George A. Heidenrich, president of his own firm, Sofqual Corporation, (Briarcliff Manor, N.Y.) which advises companies on how to improve their software development, "You may make twice what you made as an employee, but you're only going to get to keep 150 percent." And that's *ideal*. You have to pay out both sides of Social Security, for instance (employee and employer); your non-group medical and life insurance costs will stun you; your phone calls, even with such "longer distance" discount carriers like MCI or GTE's SPRINT, may be astronomical; and of course, you have to hustle business and scout out clients at your own expense. In addition, and probably most important from a computing standpoint, your connections can get very hairy, especially if you're trying to connect a slew of unlike personal computers with a diverse batch of client mainframes.

"A lot of companies are reluctant to let me get into their mainframes with a personal computer," Heidenrich reports. And that's his job. Even when the connections are relatively easy—usually, they're not— corporate DP people often balk at the

"intrusion." Says Heidenrich, "The client's computing situation is often as complicated as yours is, and you've got to figure out both of them."

Heidenrich, for one, has had his own series of complications to deal with: In his home office, he's got Radio Shacks, Osborne 1's, a Xerox 625C Memorywriter, a couple of printers, a Commodore PET left over from the early days, and a few portable computers to boot—and he's still trying various direct-connect and hardwire techniques to make them talk to each other, and to the client mainframes and electronic mail services, as well. The point is, he doesn't have a company DP manager he can call on at any time to solve a problem. At best he can get a manufacturer's hotline number and "talk through" a difficulty on the phone with someone who probably knows less than he does. That's not a small problem when you're an independent, and the documentation is awful, and you want to make some difficult connections firm, especially when they're "non-standard" pin connections on an RS-232 interface.

Doing it

Whatever the problems, though, Heidenrich enjoys his job. "Often I have to be in two places at once," he says. And that requires a lot of planning and connecting. Heidenrich didn't do a lot of planning when he started his home office, he admits now, but he believes that anyone who tries it should. Here are some considerations he and several other home/office connectors point to:

First, and this should be self-evident by now, decide whether you've got the right stuff to try it. "Situation assessment," in other words. Evaluate your self-discipline, your finances, your backup support (like the income and inclinations of your spouse or significant other), and the potential impact on your tax situation. If, for example, you'll be working at home, and your employer

will not reimburse you for some of your expenses, you may be able to deduct them as part of a home office expense. It's best to check that out with your accountant.

If your tax situation improves, though, but your family life doesn't, consider *not* doing it. Some wives, for example, don't want their husbands around during the day, and vice versa. Some spouses gulp down their curiosity (rage, doubt, you fill it in), only to explode unexpectedly, later. It's probably a good idea to ask your spouse, and kids, what they think about it. And you might consider easing into the situation—working, say, only a few hours, or one or two days a week, to see how it feels.

After that, much depends on the successful performance of five (more or less) sequential acts: creating a space, convincing your boss or potential clients, working out a schedule and supply route (including who buys the supplies, publications, mailing, copying fees, etc.), getting your computing together, and finally, getting down to work. The boss part, ironically, may be toughest. As a strategy for presenting your idea, you might, again, suggest "easing in" part-time, especially if you are a trusted and proficient employee. Explain that you want to do this on a "trial" basis. You believe you *can* do it. Don't be shy about it, in other words.

If that strategy fails, however, you may have to prepare yourself for an unpleasant outcome or two: Either your boss refuses to talk turkey and you're back to the old 9 to 5, or you could be out on your ear. "Sure," your boss says,"You can telecommute from home. As a *free-lancer* mind you, who gets paid by the piece!" Oh sure, that could happen. But decide what you're going to say, and how you'll brace yourself if it does. Sometimes free-lancing can be delightful, especially if you enjoy working *all the time*, with no more security than your own talent.
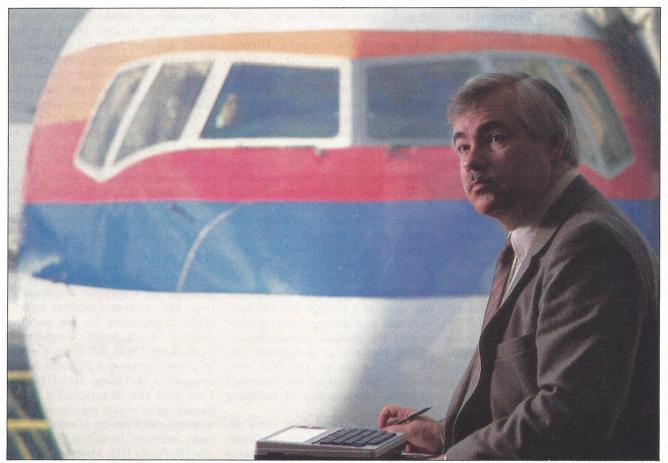
Sounds risky, doesn't it?

The number of telecommuters may soar to 13 million by the end of the century.

It is risky, especially when you're setting a precedent in your company. I do believe, though, that if you like to set precedents and don't back down, you'll get your home/office connection, somehow, sometime. When you do, you'll have to figure out what kinds of productivity tools you'll need and the types of computing and voice connections to make. For one thing, compare the rates for carriers like GTE's SPRINT, MCI, and your local telephone company. Companies like SPRINT and MCI may offer discounts of up to 50 percent in evening or night hours for interstate calls; SPRINT now has received approval to operate within the state of California. In addition, a subscriber to SPRINT service can dial an access number and travel code in order to

use the service from phones outside the home. SPRINT does not offer special services for personal-computer data traffic, according to its representatives; but most communications software can probably be reprogrammed to tell your modem to dial the series of numbers needed to get into SPRINT. For this purpose, SPRINT's competitor, MCI, offers full service for personal computers transmitting at 100, 300, 1200, or even 4800 baud (conditioned services for high speed transmission are also available). With MCI's program called The Advantage, a black box, or conversion system, can be installed in tandem with your phone line. The unit will automatically dial MCI's local number and the proper access code when the phone is off-hook, so your computer and modem can dial

numbers directly. You don't have to recode the software to execute the more complicated MCI dialing procedures. That's handy, if you're not. Otherwise you can go through the regular telephone company lines. Your local company may offer a range of services you can't get anywhere else, like call forwarding, teleconferencing, even a private monthly line you can purchase just to link your home with your office 35 miles away. If you think such a link is superfluous, consider the cost of making toll calls these days even within a single area code. If you are making calls constantly to your office from

Consultant George Heidenrich has created a complex computer connection which lets him work while he travels, sending data from his portable computer.

home, a $3.50 charge for unlimited use is a very wise investment.

Connections—hard and easy

And what of computers? Most likely, you'll be thinking about three or four types of computing connections: disk to disk, or more accurately, drive to drive (carrying floppies from one work site to another); modem and telecomputing to other personal computers; electronic mail services; and use of on-line data bases, such as Dow Jones News/Retrieval, CompuServe, Dialog, and others.

Some of these data bases, such as the Source, with its Participate feature, and CompuServe, also offer real-time computer conferencing capability, so you can compute/talk with your colleagues and clients and transmit decent-size memos while you're conferencing. Another independent service, the Electronic Information Exchange System (EIES), also allows you to do this; it's operated by the Computerized Conference and Communications Center of the New Jersey Institute of Technology, and is available to approved subscribers at a flat rate ($75 for business customers; $25 for individuals), plus the costs of accessing the service through so-called "packet switching" telecommunications networks like GTE's Telenet and Uninet.

Another important network available for personal-computer traffic is Tymshare's Tymnet. All these private networks allow the user to dial a local number that connects the personal computer to any number of data bases and utilities around the country. Hundreds of local Tymnet and Telenet numbers are available; they can save you money when dialing into remote data bases. Getting into these networks, though, with your modem and communications software, may require additional log-on procedures, but most of these can be automatically encoded into your communications software.

Something comprehensive now ought to be said about the "ideal modem" and the "perfect communications package." No such animal exists—modems differ, depending on the connections you want to make, and the speed. Some transmit data at 300 baud and some at 1200 baud. If you want to reduce your phone costs, and you have large chunks of data to transmit at any one time, buy a 1200-baud modem.

Modems, incidentally, are usually machine-specific, and their function is to take parallel data from your computer, convert it into serial data, and then into a form that can be sent across the phone lines. There are two basic types of modems: an acoustic and a direct connect. An acoustic coupler connects directly to the handset of the telephone; it doesn't require a plug into a modular jack. A direct-connect modem plugs directly into the jack. An acoustic coupler is the best choice in places where modular jacks are in short supply. Direct-connect modems, on the other hand, are favored because they weed out background "noise" better than acoustic couplers.

Perhaps, though, it isn't all that simple. I recommend the overview of modems and communications software capabilities in Jim Keogh's "Dialing for Data," a buyer's guide in the December 1983 issue of *Personal Software*. In this article, Keogh points out that communications software offers a variety of capabilities, some of them quite sophisticated. Among the most desirable features are: auto-log-on capability; automatic dialing (you type the number you want at a prompt and the software tells your direct-connect modem to dial the number automatically); editing features, to manipulate text once you've got it; and text verification, which allows the computer to check the accuracy of incoming characters.

In addition, some of the more advanced packages allow remote "interaction" with the other computer on-line—an example is Hayes Smartcom II for the IBM Personal Computer ($119); some permit transfer of files directly to disk in the receiving computer (Transend, from SSM Microcomputer Products, Inc.). In some cases, computer manufacturers provide modems built into the system, so your software choices are limited. But the main thing most communications software packages allow the computer to do is to send files in ASCII (American Standard Code for Information Interchange). ASCII allows many different types of computers to talk with each other; it's a kind of universal language that computers use to translate binary code into symbols we understand as letters or numbers. By using a modem and software, and transmitting our data in ASCII, we can get around a lot of "incompatibility" problems between computers of unlike operating languages. The stickler, though, is the set of so-called "control characters" in unlike computers; these are the characters that control format settings, such as boldface, tab sets, spaces between paragraphs, etc. Often, when transmitting in ASCII, these characters are lost or garbled and they must be reinstalled in the new document once it's stored in the receiving computer. Still, transmitting in ASCII code over the phone lines is often easier for people than trying hardwire or "direct" connections between computers.

What next?

In Houston, Mark Wood, a support manager for Computer Representatives Inc., oversees several home/office connections for his working group of 14 salespeople. Wood does it by working "70 to 80" hours a week, he claims, on several different Apple computers including IIs, IIIs, the Lisa and the Macintosh (at his home), all of which require separate modems and a variety of communications software, including Access III (for the Apple III), Microcourier and

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Transend (Apple II), and Lisa-Terminal. Each one "speaks" to the specific machine hardware and each formats files in different ways. Microcourier, for example, has an electronic mail feature; Transend prints files automatically to disk so that Wood can polish them with AppleWriter, a word-processing package.

Why such a mix?

For one thing, Wood represents Apple primarily; he has to know its products. All of his staff keep in constant touch with Apple through the company's own E-Mail system, accessed through Tymnet. The other reality is that since they have unlike equipment, they want to use it effectively. So, in addition to using their modems—a series of Novation products, the Autocat, Smartcat and J-Cat, each of which offers a varying combination of baud rate and dialing features—the group also transfers files back and forth directly between machines using an RS-232 interface cable. Easy, right?

Unfortunately, it's never as easy as it ought to be, Wood explains. "If someone would just make all these compatible!" That's wishful thinking, though, and he knows it; instead, Wood has to figure out ways to make his computers connect. For example, he spends 20 percent of his time at home writing monthly reports and doing spreadsheets on LisaCalc. He can't transfer those LisaCalc files directly to his VisiCalc on the Apple II or IIe; the formats don't match. What he has to do is put the spreadsheet information on VisiCalc, save it on disk on his Apple III, then transfer the data, using Access III communication software, along the electronic mail route so the corporate mainframe computers in Cupertino, Calif., can get them. That's one way of doing it—through a modem.

But there are other times when it's better to do a "direct connect" between Lisa and the Apple IIIs and Apple IIs in the office. Using a Lisa-Terminal program, for example, and a cable that plugs into the RS-232 port of the Apple III (a superserial card is needed for the Apple II), Wood can transfer files at 9600 baud. "Once you make that connection with the cable, Lisa accepts a document just as if you were transmitting over the phone lines," Wood says. "Once you've done that, you can save it to disk and make the modifications you need." Using a modem eliminator cable for the Apple II, he reports it's necessary to change or "cross" a couple of the connecting pins (two and three, in this case), so that both computers can send and receive data instead of sending out conflicting signals. (For more information on pin connections, see Dave Gabel's "Swapping Data," September 1983 *Personal Computing*.) Changing pins is usually outlined in the documentation for most computers.

Sound complicated? It can be, especially if machines act up every time you go near them. What I'm trying to say is that performing complex or balky connections isn't for everyone. In George Heidenrich's words, "Stick with plain vanilla"—more or less standardized connections, unless you are willing to invest great amounts of interest and time. Also, a certain knack for this is required—plus the ability to read through mounds of documentation without batting an eye, expecting it will take more than one try before getting it right.

My award for valor in the face of junkyard odds, then, goes to George Heidenrich, who's been attempting to get all his home/office connections working since he went independent in 1982. As Heidenrich explains it, he's got the interest and know-how, and he's been picking up different types of computers and peripherals for some time.

But, as I mentioned before, Heidenrich has had his share of problems. First, when he got his Osborne 1, a CP/M-based system, he decided to start communicating with clients through Telenet's Telemail, an electronic mailbox service. To do it, he used an Osborne modem at 300 baud and a communications program called Amcall. Unfortunately, "the Telemail program required that you tell it what kind of 'terminal' you're using," Heidenrich recalls. "They had no listings for the Osborne." The documentation that came at the time with Telemail didn't help him, either. So he fiddled with the available options on the Telemail menu, guessing that the mainframe would accept the choice of "Lear-Siegler dumb terminal" as the most compatible. Then he had to fiddle with some communications protocols to match them up with Telemail since, again, he didn't get help from the documentation. (The manual, he reports, has since been updated.) When, for example, he dialed into Telemail, "some of the characters I got back were legible and some were garbage characters. It was the correcting characters that weren't there. I hadn't told Telemail whether I was using even or odd parity." He ended up guessing even, and was able to change the parameter in the Osborne communications program, but "it took quite a while" since he had to guess.
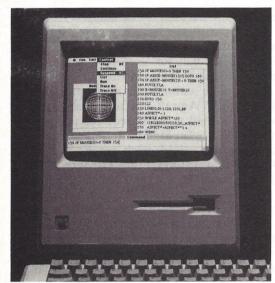
Undaunted, however, Heidenrich kept on, knowing these delays are more or less standard operating procedures when you try anything other than very standardized connections. Eventually, he figured out how to use Osborne with Telemail, learning how to print his files using WordStar, as well, despite the fact that the "Osborne documentation was less than helpful." Today, part electronic detective, part tinkerer, he's also managed to connect his Osborne to a Radio Shack TRS-80 Model 100 to swap files for reports he must write.

On airplanes, whenever he can get the time, he's writing. "That's the part about doing two things at once —you can reclaim lost bits of time

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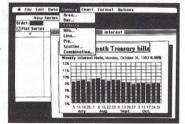
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Tapping The Corporate Mainframe

Connecting a personal computer to your company's main system isn't as easy as it looks
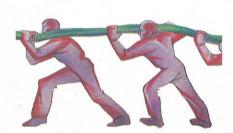
by Jacqueline Rae, Associate Editor

Let's assume you're an ambitious regional sales manager for a Fortune 1000 company. A year ago, you bought a personal computer so you could do your own spreadsheets and word processing. The computer has allowed you to bypass the data-processing department and generate reports in half the time, doing number crunching and text processing right from your desk. You have all the power you need to analyze market response to a new product or establish sales goals by region, right in your spreadsheet program. But you still need the sales history figures in the corporate data base to make a comparison between your region's sales and company-wide performance, which means waiting for the data-processing magicians to conjure up the traditional hard copy printout, formatted by region. And once you get your hands on the printout, you still have to key the numbers back into your spreadsheet's format before they can be integrated into the final report. That duplication of effort just doesn't make sense to you.

Then you read somewhere that you *could* access the mainframe data base directly, using your computer as a terminal to the mainframe; all you need is a communications board and some software. So you raise the issue with your MIS manager, who concedes it could be done, but explains that he's still investigating the best

method of implementing the connection. He throws out some jargon about networking, terminal emulation, and security constraints, and assures you he's looking into it. But you're impatient; having made the discovery that your personal computer could talk to the mainframe, you're anxious to see the program up and running. It's simple, right? Just a matter of hooking the thing up. Well, it's not quite that easy—yet.

According to David Ferris, of Ferrin Corporation, a San Francisco consulting firm to corporate MIS departments and end users, the above scenario is typical of what's happening inside large corporations today. The sophisticated personal computer user who needs to access centralized data is prodding the DP division to help him get into the mainframe, and DP, knee-deep in requests for computer training and assistance, is stall-

ing. "I think DP is being dragged into it," Ferris says. "They recognize they have to provide support and they have to be involved. But in large companies, DP is quite a large organization, and it can't do things overnight."

While Ferris believes access to mainframes via personal computers will become common in the future, he insists that most corporate users have barely tapped the potential of their personal computers, let alone considered accessing mainframe resources. "The reality is that right now, very little is really being done by DP departments, end users, or even vendors," says Ferris. "Some things are being done—it's absolutely clear that the ball is rolling. But it's rather like the status of word processors three years ago; a minority of enthusiasts are very actively aware of this, but it will be some time before massive penetration starts."

What's happening in the marketplace, says Ferris, is that software and hardware vendors have spotted a new market opportunity, and are rushing to develop it. Major software developers like Cullinet, Management Science Associates (MSA), McCormack and Dodge, and Informatics General Corporation are developing software which allows personal computers to access mainframes. This trend has set off an active dialogue in the press. "All the vendors suddenly felt that even

though they didn't have a product, they had to announce a product or say they were going to be doing something. And DP is very interested in the question of micro to mainframe links because as soon as mainframes are involved, that's their bailiwick. So that's naturally a topic that's sort of sexy for the MIS and DP literature," says Ferris.

The truth is, says Ferris, that most of what's actually being done today is confined to terminal emulation (communications programs which allow a personal computer to emulate a mainframe terminal). Most of the larger personal computer manufacturers have announced or are shipping terminal emulation packages for their systems. Apple recently announced a terminal program for its Lisa and Macintosh computers, and Texas Instruments is distributing an emulation program for its TI Professional Computer, as are a number of other manufacturers. IBM's announcement of the 3270 IBM Personal Computer, which emulates the IBM 3270-size terminal, is expected to have a big impact on the corporate market. Ferris predicts it will be very popular among corporate users who want regular access to IBM mainframes and minicomputers. (The 3270 IBM Personal Computer goes several steps beyond terminal emulation, providing the user with four windows—three to access data from the host system, and one for Personal Computer applications.)

Some vendors, like IBM, Xerox, Data General, and Direct Incorporated offer complete systems designed to tie directly into the existing mainframe environment. These systems, when teamed with a local area network like Corvus's Omninet or Xerox's Ethernet, are configured to bridge the gaps in corporate communications and help take advantage of the huge investment most Fortune 1000 corporations have sunk into their host systems. But even with these communications solutions, data processing will have its hands full implementing the connection and teaching unsophisticated users to use the mainframe's resources.

Terminal emulation lets you download information from the mainframe and look at it on your screen or print it out. With some programs, you can also save the file to a diskette and edit it on your personal computer. This means you can call up and look at mainframe files—maybe even edit them with your word processor. But terminal emulation does not give you the ability to dump the data into your computer's spreadsheet or data base. And even downloading is difficult for most personal computer users to do. "Those things are not particularly difficult for the computer professional, but for the average end user having to worry about modems and XON/XOFF switches, and all the jargon that's involved, it gets very intimidating," says Ferris.

Suzie Garcia, a business applications analyst for Lockheed, works with large mainframe data-base files. She provides support to a staff of 45 people who require regular access to the data-base files on Lockheed's various mainframes and minicomputers. While Garcia agrees that terminal emulation is only the starting point for the mainframe-micro connection, she mentions a number of immediate problems it does solve.

She points out that project-management software available for the mainframe is generally far superior and more powerful than programs offered for personal computers. "Another use is graphics," she

says. "The shift from straight tabular data presentations to graphic analysis and graphic presentations is one reason a lot of our people are getting into mainframes. There's been a shift in that a lot of your accounting and managerial types are really learning the advantages of graphic presentations and graphic analysis of their work." This is important because in most corporations, expensive peripherals such as laser printers and large graphic plotters, necessary for preparation of presentation reports, are only available on the mainframe. Terminal emulation makes these applications accessible to personal computer users.

But terminal emulation is only part of the solution. Once you get terminal emulation running on your personal computer, you have a massive data base at your fingertips. But the average user has no idea what that data base will do for him, or how to ask for what he needs from the mainframe. Your Apple or IBM Personal Computer doesn't speak mainframe, and the host computer doesn't speak micro—somebody has to translate your queries so the mainframe can understand them. This means you can't use your micro operating commands under MS-DOS or CP/M.

Garcia also stresses that even with DP's help, making the transition from personal computer user to mainframe user requires a high degree of commitment from the user.
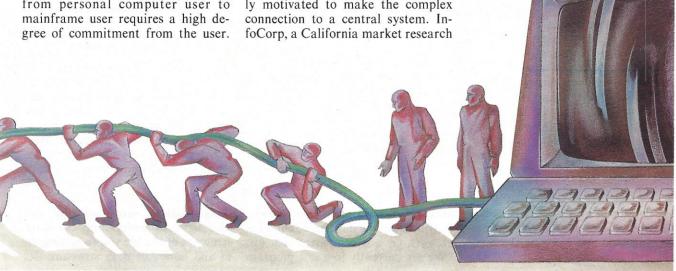
"One of the assumptions I would make is that you have enough interest to be willing to learn the mainframe operating system," she stresses. "It's just like any micro; it's another operating system."

Learning the mainframe operating environment usually consists of taking classes from DP. The alternative is to train someone in your department to become the systems expert, which is the job Garcia took on. In addition to training and support, she writes programs that simplify the number-crunching and data-base requirements of her group. "In some departments, there are going to be people like me to do it for you— people who will take the data, and when you see it, it will be in your SuperCalc file—but I will have done the formatting." But Garcia points out that there are individuals who will go to great lengths to learn the mainframe language. "Some people want absolute control over their data. If they don't have control over it, they don't have confidence in its integrity. That really goes back to some bad experiences they've had in the past with computers. The way they get around it is to learn whatever it is they need to get what they want accomplished."

There are rare cases in which an entire group of end users is sufficiently motivated to make the complex connection to a central system. InfoCorp, a California market research firm for the computer industry, uses an IBM System 38 minicomputer to develop and maintain volumes of research data. Originally, the company purchased nine IBM 5251 terminals for its analysts, who require constant access to the central data base. Then one company analyst bought an IBM Personal Computer and terminal emulation program. According to William Frank, senior vice-president, the company plans to buy personal computers instead of terminals in the future. Frank explains: "The personal computers cost us less per month than a terminal." The cost and enhanced capabilities of the IBM Personal Computer for report preparation and remote sites make it more attractive than a terminal, says Frank. "Think about it—what would you really like to have out in a remote location? You'd like to have a personal computer that lets you do various things. At the same time, you want to be able to talk to the system and send data so you can consolidate it and do your reports and finances," Frank explains.

Frank says all of InfoCorp's analysts use the system to prepare reports for clients. For example, if an analyst gets a phone call from a client

*Most corporate users have
barely tapped the potential of
their personal computers.*

who wants to know something about a certain computer system, he can access the main data base and look at how the system is configured, how much it costs, or how it's distributed. A historical analysis, such as one which looks at five-year trends, can also be prepared.

With his personal computer Frank can also create "virtual disks" (fixed files set apart from the main data base) on the main system, allowing several people to use the System 38 as a file server. So, if three individuals are working on a five-year strategy for company growth, for example, they can work independently and dump the results into the virtual disk for consolidation. The micro thinks the virtual disk is a hard disk, and using a preconfigured workspace also helps keep the corporate data secure. "If we want to we can load it into the data base later with control," he adds.

Making it real

Ferris, Garcia, and Frank all agree on the necessity for software that simplifies the linking process for the micro user. The problems of getting into the data base, finding the data that's needed, and transferring the data directly to a spreadsheet or personal computer data-base file have to be resolved before the connection will be productive.

These problems can be solved directly by the MIS people, or by outside software companies familiar with the mainframe environment. But no matter who writes the software, the DP department will have to take an active part in its implementation. The challenge for the mainframe wizards is to provide solutions that are transparent to the user.

In answer to these problems, Informatics General Corporation—in joint development with VisiCorp—has developed a software tool called VisiAnswer, which simplifies mainframe access and converts the complicated data-base format into the

row-and-column format of VisiCalc and VisiOn. Other developers are working on similar products. "Some of the more important announcements have come from MSA, McCormick and Dodge, and Informatics," Ferris says. "The first two of these are providing easy ways to download data from their mainframe accounting packages. MSA in particular is doing good things with its product, Peachlink. And VisiAnswer will let you download data from a lot of different kinds of mainframe data bases, not just those used by the MSA or McCormack and Dodge packages. We think what Informatics is doing is important, although it will be a while before VisiAnswer will work on most mainframes satisfactorily," he adds.

Software designers are also working on conversion programs for their popular spreadsheet and data-base packages. Developers like Context Management Corporation (Context MBA), Lotus Development (Lotus 1-2-3), Sorcim (SuperCalc), and smaller companies like Chang Labs (Microplan) and Advanced Data Institute (Aladin) are just a few of the companies working on software that makes the link to mainframes less painful. But, according to Ferris, it will still be a while before all the bugs are worked out and the average user can access and make sense of the central data base.

In addition to software that converts personal computer commands to the mainframe's language and vice versa, Texas Instruments is working on English language programs that make talking to mainframes even easier. TI's newly announced NaturalLink enables the office worker to use windows with English words or phrases to form complete sentences that query the data base. NaturalLink is currently only available for accessing the Dow Jones News/Retrieval on-line data base, but TI is at work on a development tool kit. "We are currently in a test program

with some select customers with a second product that we're calling the NaturalLink Development System ... a tool kit which allows a data-base manager to generate his own natural language front-end," says Stephen Harris, product manager for NaturalLink. With this kind of English language query program, unsophisticated users can access the data they need without learning a new operating system, and the DP administrator retains control of the data.

What's in the mainframe?

Assuming you're willing to go through the steps we've described to get your computer to talk to the central system, what can you expect in terms of payoff? Financial analysts are usually already familiar with the kinds of data harbored in the company data base. "Many important programs have already been developed on their company's mainframe, such as accounts payable and receivable, general ledger, and order entry," says Ferris. In addition to access to expensive plotters and project management software, financial planning and modeling applications are also handled best by mainframes. But the relative value of the mainframe's number-crunching capabilities and data-base files to a project scheduler or proposal writer may be obscured by a lack of direct experience.

The mainframe's data structure, often consisting of sequential files, looks very different from what personal computer users are used to seeing. Locating the field and item you need to access can be a real nightmare for the unsophisticated user. "First of all," says Garcia, "you've got to know what you want to do with the data, what the result is that you want. Then you have to be able to design that in SuperCalc. But you also have to understand the data structure of the file you're getting into and how that data structure fits

into the DIF spreadsheet format," he adds.

According to Merritt Lutz, group vice-president at Informatics, the reason most people can't tell you what they want to do with the corporate data base is because they've never been able to sift through what's available to them. Lutz describes the user who needs mainframe access as very simplistic. "There's a lot of data up there, and I don't know what I need until I can get samples of it. You've got to help me with just a couple of applications that cut through all the complexities that have been built up over the last 25 years on the mainframe," he says, imitating the user's confusion.

Once programs like VisiAnswer and Peachlink become widely available, users will have the opportunity to sample the data files available to them. This will help them discover how the mainframe's data-base and number-crunching capabilities can get the job done. Ferris cites one example of how mainframe power can simplify a task: "Say an individual is handling a new sales campaign, and wants to track sales to 2000 dealers. He's using VisiFile, and he wants to have one record for each (dealer). He'd have to spend a lot of time inputting data that's already on the mainframe," Ferris explains. When users can routinely access corporate files, this kind of tedious work will be avoided. Garcia also offers an example of the benefits of harnessing the mainframe's resources and processing power: "Proposal writers and project planners often have to keep track of budgets and job costs on a company-wide basis. If each department head were linked to the mainframe, the budget figures could be regularly updated and compiled across the company. In this way, everyone works from the same numbers and large projects can be handled from one central file. Once the numbers are compiled, it becomes

USING MICRO-TO-MAINFRAME LINKS

Access to large information banks greatly expands what a personal computer can accomplish, especially if the computer can handpick data and avoid overloading its memory bank with mainframe-size files. Are micro-to-mainframe software links really easy to use? How much data-processing expertise is required?

To find out, let's take a step-by-step look at VisiAnswer, one micro-to-mainframe link, and find out exactly what a personal-computer user must do to extract useful information from a mainframe. VisiAnswer is marketed by Informatics General Corporation and is compatible with IBM Personal Computers and any IBM, or IBM-like, mainframe.

VisiAnswer acts as the Personal Computer's guide to mainframe data, and communicates with Answer/DB (also from Informatics), the mainframe's extractor of data. These two software products work together to move information in ways both the mainframe and personal computer can accept. The work VisiAnswer and Answer/DB do is transparent.

To begin, the Personal Computer user calls up a menu of commands, moves a cursor to the chosen command, and presses the Enter key, or types the first character of the command. If the user is unfamiliar with the meaning of the commands, he moves to a series of Help screens which give more detail on the commands available. To create an order for information, called a task, the Personal Computer user will select the Identify command and type in the name of the task and a one-line description. This identification process will be used for each new task, creating a library of titles that can be referred to and reused later.

Next, the user can browse through a list of mainframe data bases available to him. This list has been chosen from the universe of centralized data bases according to the Personal Computer user's particular needs, and with the consent and assistance of those managing the mainframe facility. Glossaries

created through Answer/DB at the mainframe aid the user in selecting the appropriate data base.

Now the user decides what form the information will take when it is delivered to the Personal Computer. Detail retrieval brings fields selected from each record. If the volume of information at this level is too great, the user specifies a Summary retrieval. Under this category, information is received by Grouping Fields—meaning, for example, that figures are delivered as totals by month, year, or product. Or the information can be summarized by Cross-tab, delivering two-dimensional tables such as figures for each customer, and for each month.

Once the information format has been defined, the user selects the specific data-base fields he or she needs from a list approved by the mainframe managers. As each field is highlighted, the screen offers a one-line description, letting the user understand the content of the field without references to other sources of documentation. Once fields are selected, summarization by total, count, and maximum or minimum values can be chosen.

Next, the user qualifies the task by using AND/OR to set selection criteria. A selected field is called to the screen, and relational operators ($=$, $-=$, $>$, $<$, $=>$ and $<=$) are chosen by pressing the Enter key. Then the user is prompted for the value to be used in the comparison and decides whether an AND/OR operator is needed, or the expression can be terminated by pressing Escape.

Next, the Task Grouping is specified. If the task is to be delivered in detail, a Grouping command will specify the order of records and determine when summarization should occur. Cross-tabbing is indicated by row and column values. Last, the user moves to the Process menu, invokes the Order command, and VisiAnswer establishes communication with the mainframe. When data is received from the mainframe, the user may convert to a VisiCalc format.

What should you look for in personal

Before you go looking for personal computer software, you should know what personal computer software looks like.

(You're not alone if you don't already know that software programs come in a package.)

Programs are "pre-recorded" on cartridges, tapes or diskettes. And, although you can't tell by looking at these cartridges, tapes or diskettes, the programs on them can be very different.

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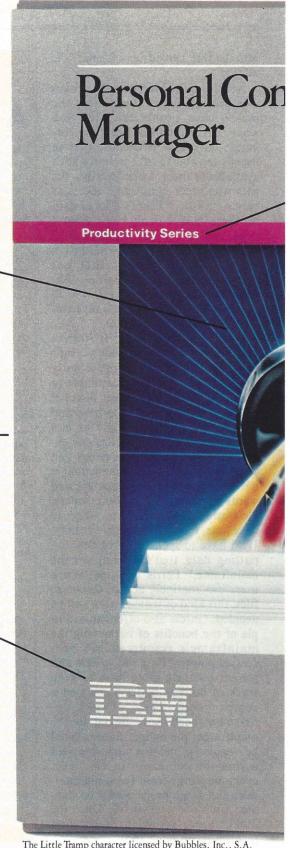
What the value is.

What are improved math skills worth? More efficient inventory control? Faster communications? What is accomplishment worth?

Any way you look at it, the value of personal computer software is the value of doing your best.

What compatibility means.

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computer software?

Audited? You Can Be Prepared If You Plan Now

Your computer can help you look good if you end up in the tax examiner's office

by Michael Wenberg

Audit. It's a word that can turn even the most self-assured executive's knees to jelly. And rightly so—Internal Revenue Service (IRS) audits are serious business. For proof, look no further than the 25,000 IRS employees actively involved in conducting tax audits at IRS service centers around the country. From these service centers, all roads converge at the massive central computer in West Virginia. Its purpose? To pinch, poke, add, divide, and process the 95 million tax returns received each year. It's here that the decision "to audit or not to audit" is made. If you're one of the unfortunate few whose return is kicked out by the computer, chances are you'll receive an official looking notice requesting "additional information to verify your correct tax." What you do next will determine whether you end up paying more of your hard-earned dollars to Uncle Sam. Avoiding a tax audit is often a matter of luck—but surviving one requires a lot of hard work. In either case, a personal computer can make the outlook rosier.

Most tax experts agree that organization and record keeping are the keys to a successful audit, and many people are turning to their personal computers for help. If you don't al-

Michael Wenberg is a free-lance writer and former Managing Editor of Micro Discovery *magazine.*

ready have your household and business records on your computer, this is the time of year to think about setting up a computerized tax system. The home-accounting software available today offers an excellent way to organize your household budget, anticipating the possibility that some day the IRS may ask you to verify one or more items on your personal tax return. It has the added advantage of letting you know where your money is going and what you can expect to pay in taxes next year.

Larry Wright, an IRS spokesman in San Francisco, agrees that a personal computer can help you avoid an audit, or survive one if you've already been summoned. One obvious reason, says Wright, is the computer's usefulness as a tax-preparation tool. "Computer- or machine-prepared taxes help take care of math mistakes—the most common error involved in tax preparation," he says. In this way, taxes prepared with computers are a boon not only to the IRS, but to the professional tax preparer and the individual as well, according to Wright. A return that's properly calculated is much less likely to be kicked out by the central computer or to come under scrutiny from an auditor. Along with its value as a tax-preparation tool, a personal computer also has great record-keeping potential. Wright explains that most people run into difficulties when they
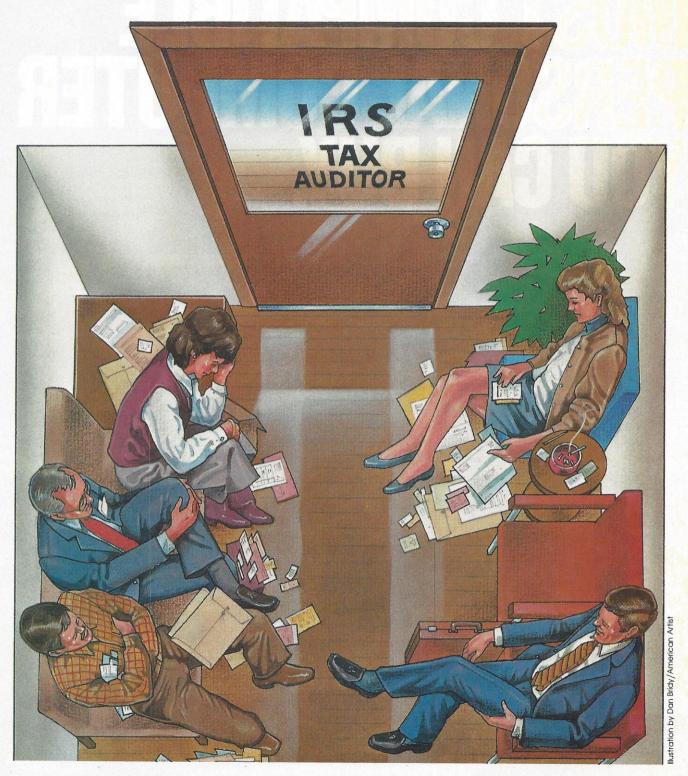
are unable to substantiate their deductions. "The system is set up to find returns with possible errors," he says. "If you want to survive or avoid a tax audit, you must be able to substantiate your claims. If you can't, you're sunk as far as the IRS is concerned." That's where the software can really help.

A priority in setting up a computerized tax system is getting your records in order. Billy Neighbors, a Newport Beach CPA who uses an IBM XT at work, says, "Computerization has helped enormously in solving record-keeping problems. The greatest problem both corporations and individuals encounter in preparing tax returns is accumulating facts. If you solve that difficulty, then once the accountant has the facts—all the facts—the job of preparing a tax return is relatively simple. The personal computer has brought this record-keeping capability into the home and small business, where previously it was confined to large accounting operations."

In addition to organizing your deductions for preparing a return, good records can also help pacify an IRS examiner. "Using a computer helped me when I was audited," says Allen Miller, an engineering executive from Seattle, Washington. "I was called in for taking an improper deduction. I treated an excise tax in the sale of my rental home as an expense

Avoiding or surviving a tax audit is hard work. But in either case, your personal computer can help.

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CIRCLE 40

*If you don't already have your records
on your computer, this is the time to
think about setting up a system.*

**LEISURE/
ENTERTAINMENT**

rather than a long-term capital gain. Because of that, the IRS agent decided to audit my entire return. I was told to bring in everything. During the audit, I was able to go through my deductions and show a printout which totaled the numbers used to arrive at those amounts. If he'd asked me where those numbers came from, I could reach into additional files and pull out the appropriate vouchers."

Miller, who uses a souped-up TRS-80 Model I computer, chuckles when he recalls the IRS auditor's response to his computerized record keeping: "He said, 'You're very well organized, aren't you?'"

Don Nicol, a business consultant to physicians and dentists in Spokane, Wash., agrees that computerized record keeping can help during an audit. He has participated in a number of audits for his clients over the past 10 years, and says, "Most people fail to keep the documentation necessary to justify a deduction." He points out that "people can obviously keep as good a set of records as a computer, but there's the time factor. Because of time, people are often not as fastidious as they should be when it comes to record keeping. Computers can help."

Simon Pearlman, a tax partner for the Orange County, Calif., office of Arthur Young & Company, voices similar sentiments: "A computer does not help someone survive an audit per se, but in the sense that it helps a person get better organized, it's a benefit. While an examiner is objective, the subjective aspect of having your documentation well organized can't hurt."

Jack McNally of Cape Coral, Fla., is in the construction and real estate business. A convert to computerized tax preparation after a bad audit experience, McNally now operates a tax-preparation business on the side. He keeps his personal tax records on an accounting package called Financial Management System. While you can also use tax-prepara-

tion software to maintain tax records, McNally says it's much easier to record them on an accounting program that's designed specifically for the purpose. The primary problem with keeping your tax records on tax-preparation software, he says, is speed—or lack of it.

Another believer in the personal computer's record-keeping abilities is Rufus Roper, a Colorado police officer. He uses The Home Accountant, from Continental Software. Home Accountant retails for $50 to $150, depending on the type of system you buy it for. "My budget is divided into specific categories," Roper says. "I update my records every day. No lapses. At the end of the month, I do a hard copy. Whatever entry I need to scrutinize, The Home Accountant lets me do that. At the end of the year, I have the appropriate information to use on my taxes."

Donald Hill of Computer Tax Services in Incline Village, Nev., agrees that computer documentation is a lot better than relying on a shoe box full of receipts. Hill sells a checkbook/financial system for Apple computers called Money Street ($99.95). He explains that Money Street "basically prepares information that you can then take to an accountant to use in preparing your taxes." With Hill's program, you can enter checks throughout the year and mark them as either a taxable or nontaxable item. "It lets people keep track of important information before they forget," he says.

When shopping for a home record-keeping or accounting package, keep in mind that it should be simple to use and cover all contingencies. If not, you're not likely to use it faithfully. Accounting packages usually include a check register, which means you can write checks and print them out on a dot-matrix printer with the form-feed checks supplied by most banks. This makes record keeping easy and keeps it down to one step. Most pack-

ages also allow you to print out summaries of expenses and income, as well as your check register, which can then be presented at an audit.

Preparing your own

Once you make the commitment to get your records in order, you may decide to use your computer to prepare your own taxes, as well. If all the records are in order, after all, half the job is already done. When you begin shopping for tax-preparation software, however, you'll quickly discover two things: First, there's not much out there, and unlike other software, tax-preparation packages have to be updated every year—tax rates change; forms are rewritten; and laws are amended. To stay in the tax business, software companies have to make a greater commitment in time and resources to keep up with changing laws, and incorporate those changes in their programs. Unlike word-processing or accounting software, there's no mad rush to address the tax-preparation market. Secondly, most tax-preparation software on the market today costs nearly as much as a computer. Fortunately, there are a few good, affordable packages out there.

"I wanted to buy a computer to prepare my client's tax returns," says Jerry White, who operates Professional Tax Service in Johnson City, Tennessee. "I was going to buy a TRS-80, but the only tax-preparation software I could find to run on it costs $1100." White ended up buying an Apple IIe instead. The tax package he purchased with his computer was the Tax Preparer by Howard Software Services. The Tax Preparer runs on the Apple III and Apple II series computers and IBM Personal Computers. The package retails for $225 for the Apple version, and $250 for the IBM version. Yearly updates are additional.

"I really just took a gamble with the Tax Preparer," says White. "There really isn't that much out

there unless you want to spend a fortune. I found it hard to believe the Tax Preparer could do all the things it claimed it could, but it's really a nice piece of software. It supports at least 95 percent of the forms that I normally fill out."

When you're looking at tax-preparation software, that's probably the most important thing to consider—does it calculate the forms and schedules you have to file each year? To be sure, examine your previous year's returns to see which forms you regularly fill out. Then, when you look at software, make sure you're covered. Some less expensive packages only handle Form 1040 and a few of the more popular schedules. If you find you don't use most of the forms, you can probably get by with a less expensive package.

Until he decided to computerize his business, White had been preparing all of his tax returns by hand—but he saw the potential of using the computer and appropriate software for expanding his business. Now, with the Apple and the Tax Preparer, White figures he can complete an entire tax return in 40 minutes, where it used to take him an hour. "I can complete forms faster than before," he says. "But the number one reason I went with the computer was for the math calculating capabilities which would ensure greater accuracy on the returns." White figures this minimizes his client's chances of being audited.

White feels that using the Tax Preparer is like reading through the official IRS forms. You start at the top of the 1040 and enter personal information such as your name, address, social security number, and exemptions. Then you enter your gross income and withholding—but unlike doing the forms manually, where you have to repeatedly enter the same information on each line to which it applies, the Tax Preparer automatically lists it on all lines of the 1040 on which it should appear. And

when you itemize deductions on Schedule A, or list profit or loss from a business on Schedule C, the Tax Preparer automatically recalculates all numbers on all forms that are affected by the new figures. The Tax Preparer will even calculate your ACRS depreciation on Form 4562.

The Tax Preparer prints an exact facsimile of the 1040 without titles and headings. White has an acetate copy of the official 1040 form, which he uses as an overlay on the computer printout. The information generated by the computer fits on the proper lines and blank spaces of the 1040. He then makes a photocopy of both the return and the overlay, which produces an IRS-acceptable return.

If you don't like the idea of using the overlay, you can order perforated computer paper printed with copies of the official 1040 form. You just load this paper into your printer, and the computer enters the tax data directly onto the form.

For other forms, the Tax Preparer prints a facsimile which contains all the information on the official form, but in a slightly different format. The IRS will accept facsimile reproductions of all forms and schedules except the 1040, which must be an exact copy of the original. You might want to obtain a copy of the IRS Revenue Procedure 82-4, "Substitute Computer-Prepared Forms and Computer Generated Forms." The

THE INS AND OUTS OF IRS AUDITS

Statistics show that your odds are around 60 to 1 against being picked for a tax audit. As your income goes up, so does your likelihood of being audited.

There are many reasons a particular return is picked out. "Right now, we're going after every abusive tax shelter we can find," says Larry Wright of the IRS. That's one auditable offense. Another? Let's say the IRS finds fault with your business partner's return. If he's audited, chances are you will be, too. A large number of deductions can also be a red flag to the IRS. To some extent, the decision to audit is based on the current climate in the IRS environs, making it very difficult to predict when a person's return will come under scrutiny.

"If you make over $100,000 a year," he explains, "you stand a 12 to 15 times greater chance of being audited than the person who makes less than $10,000 a year." More specifically, statistics indicate that if your income is between $25,000 and $50,000 a year, your chance for an audit is 3 percent. Earn $50,000 or more and that figure doubles to 6 percent. Of course, statistics are small comfort if the computer spits your return into the

"For Examination" basket. But even if that happens, you still might not be contacted by the IRS. The agent who reviews your return has the option of disregarding the computer's choice. If for example, your return contains a suspicious deduction but you included the appropriate documentation with your return, the examiner may be satisfied.

This is, however, no consolation to the small percentage of taxpayers called in for a closer look at their tax returns. If your number comes up you may be subjected to one of the four general types of audits. The "correspondence audit" can be the easiest to take care of. If you draw this type of audit, the IRS will contact you by mail and ask for a verification or explanation of the particular discrepancy on your return. Sometimes all they want is a cancelled check or copy of the appropriate receipts. If you provide satisfactory documentation, they may not ask for more money. If you don't fully satisfy the agent, you may have to pay additional taxes, plus interest and any applicable penalties.

The "office audit" is the most common audit conducted. The taxpayer is required to make an appointment with

If you take a deduction that you shouldn't, and you get audited, you can't use the computer as an excuse.

report is contained in Publication 1168, which can be ordered from the IRS. This explains the exact guidelines that have to be met before the IRS will accept your computer-generated tax forms.

One drawback to the Tax Preparer and most other tax packages on the market, as Jack McNally said earlier, is that they are notoriously slow—although it is a problem that manufacturers are dealing with. Because there's so much information needed on the program diskette in order to process all the various tax forms, all the data can't be loaded into your computer at once. As you move from form to form or make different calculations, the program

must keep referring back to the disk to load more data. It's important, therefore, that your system have two disk drives—with almost any tax package. The programs will work with only one drive, but you'll go crazy swapping disks.

"Calculating your taxes with just one drive wouldn't be worth the effort," stresses White. "And if you use the Tax Preparer on an Apple, make sure you have 64k of memory. I first tried the package on a 48k Apple II, and it was so slow I almost didn't buy the software." (Howard Software recently added a utility program called Diversi-DOS to the Apple version of the package, which speeds up the program.)

In addition to tax-preparation software, your favorite spreadsheet program can sometimes handle a simple tax return. According to Miller, VisiCalc has been another asset in preparing his taxes. He has generated a template using VisiCalc which duplicates the lines on a 1040 form. There are also a number of books out which provide tax templates for the popular spreadsheet programs, such as *Doing Business With SuperCalc* by Stanley Trost (Sybex Books, $12.95). When looking at templates, however, make sure you get the most recent edition of the book with up-to-date tax information.

Pete Higgins, a product manager at Microsoft, also finds that spreadsheets, like Multiplan, are important tax-preparation tools. "Multiplan has extensive linking capabilities that let you connect different documents together. This is a terrific capability to have when doing your taxes," says Higgins.

Once you have your tax record-keeping system in place and are ready to take the simple step to preparing your return yourself or producing organized records for an accountant, your likelihood of being audited should drop sharply. And if your return does come under examination, your computerized records should go a long way toward keeping an auditor open minded. If you have a reasonable explanation for how you came up with a figure that isn't substantiated by records, and the rest of your records are in good order, the auditor may give you the benefit of the doubt. There are many gray areas in the tax laws, and good record keeping will certainly put you at an advantage.

As beneficial as personal computers can be, and we've discussed many of the advantages, don't be disillusioned into thinking that using a personal computer is a quick way to tax nirvana. In fact, experts caution that using a personal computer can

the local IRS service center so an agent can personally go over the return. Often the agent is only interested in a particular section of the return, i.e, entertainment expense, charitable contributions, or dependency exemptions. Bringing the correct information with you will help make an office visit a tolerable experience.

A "field audit" is usually reserved for those individuals who have a complicated return or own a business. The agent will make an appointment to review your return either in your home, office, or perhaps the office of your accountant or attorney. You may think that getting an IRS agent onto your own turf will give you a slight advantage, but an agent will also consider your surroundings in relation to your return. If your tax return lists income of only $25,000 for the year in question, but you meet the agent in your $500,000 Miami Beach condo, you could have some fast talking to do. The agent could demand that you produce your bank statements, including cancelled checks, in an attempt to ferret out any income you forgot to declare on your return.

The worst type of audit, in terms of inconvenience to the taxpayer, is called the "Tax Compliance Measurement Program (TCMP)." Only a small percentage of audited returns

are subjected to this process. But if you're picked, it means a lot of lost time. Returns are selected at random for the TCMP audit, using the last digits of the social security number. In this type of audit, the IRS agent goes through a return with a fine-tooth comb. If for instance, you claimed deductions for children, you'll have to produce birth certificates. The results from these audits are used to set up a DIF (discriminate function) formula. When tax returns are processed, each line receives a score based on this DIF formula. "The higher the line score, the higher the probability of being audited," says Wright.

As David Keating, executive vice-president of the Washington-based National Taxpayer's Union explains, "The Tax Compliance Measurement Program is kind of like a Gallup poll in the sense that the results are used to create national averages." These averages are used as a basis against which all other returns are compared.

But no matter which type of audit you're called for, good documentation and organized receipts can make the difference between anxiety and peace of mind. Computerizing your personal accounting records and presenting them in a format understandable to the IRS will make the audit process a little less painful.

Software That Hones Your Management Skills

A new generation of programs helps focus your
management strengths so you can
lead more effectively

by Craig Zarley, Contributing Editor
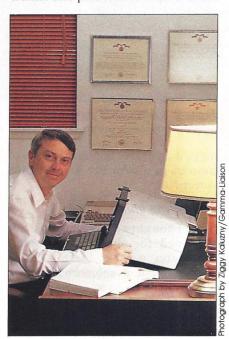
How do you teach yourself to become a more effective manager? You're confident that you can confront most business situations and come out on top, but specific managerial problems arise that exhaust your skills—a tricky personnel problem, communication snafus with a client. You usually muddle through, but in the back of your mind you know there must be a more productive way to handle the situation.

Sure, you say, we all have room to improve our managerial talents, but who has the time to go back to school or make a career out of attending management seminars? What is the easiest way to identify your strengths, pinpoint your weaknesses, and give you a specific plan of action to solve almost any managerial problem based on your individual talents?

The trend in today's corporate environment comes in the form of a new breed of training software that teaches managers to be more effective. The principle of the software is simple: Leadership comes down to finding the most effective method of solving specific problems. If you can be shown solutions to everyday business problems, you can be taught how to lead. You learn by doing rather than by digesting management theory.

The software analyzes your leadership abilities and shows you where they can be improved. You can rate yourself as a manager and compare your assessment to how your subordinates view your management capabilities. Or you can tell the computer how you would solve a specific problem, then compare your answer to those of several thousand other managers faced with a similar situation.

The new leadership software takes educating away from the corporate trainer and puts it in the hands of the

Lieutenant Colonel Steve Clement is using management training software to aid him in training U.S. Army officers.

manager—in *your* decision-making hands. Instead of viewing continuing education as a dubious enterprise, you can use the software as a tool to solve specific business problems—in other words, you can use it like a full-time business consultant.

The leaders of tomorrow

While the principle of business training software seems simple, this new generation of software promises to do for management education what VisiCalc did for financial analysis. The electronic spreadsheet programs took financial analysis away from the accountant and put it in the hands of managers, the people who make the business decisions. Instead of reacting to a problem after the fact, you were given the ability to make financial forecasts and seize an opportunity or avert a disaster before it was too late. In effect, the numbers game became decentralized, taken away from the experts and given to the people who could use the spreadsheets as everyday business tools.

The same thing is happening in corporate management training. Too often, you go to a management training seminar only to find that the instruction is geared to the entire group and not to your specific needs. The result: You waste your time and your company's money traveling to a training session that is only marginally beneficial.

The logistics of training U. S. Army officers mirrors the problem confronted at any major corporation. The Army has bases spread throughout the world and an officer's corps numbering in the thousands. To move officers at regular intervals to training centers is tremendously expensive.

To cut this high cost of centralized instruction, the Army is in the process of redesigning its training programs. First on the agenda is to purchase personal computers for the various bases and find appropriate software to instruct officers in management techniques.

The program is in its infancy, but early results are encouraging. So far the Army has purchased about 50 IBM Personal Computers for training purposes, and the initial software currently under evaluation is the Thoughtware Management Training Series from Thoughtware, Inc. in Coconut Grove, Florida.

"There are a lot of quantitative programs in the marketplace, but very few that address the behavioral sciences," says Lieutenant Colonel Steve Clement, who heads a special human technology task force. "That's what's attractive about the Thoughtware series. It can give you instant feedback to improve your leading and managing skills."

The Thoughtware series consists of the Management Diagnostic Series, which assesses your ability as a manager, and the Management Training Series, which shows you how to apply managerial skills to solve a specific business problem. The diagnostic series features three separate packages: Assessing Personal Management Skills, Evaluating Organizational Effectiveness, and Understanding Personal Interactive Styles. The management training series includes six modules: Leading Effectively, Motivating to Achieve Results, Defining Goals and Objectives, Improving Employee Performance, Managing Time Effectively, and

Conducting Successful Meetings.

"I really like the Thoughtware diagnostic capabilities," says Clement. "I can answer a series of questions pertaining to an organizational or communications problem, then compare my responses to my subordinates and to how 100,000 other managers responded to a similar questionnaire. It lets you examine the issue from three separate data points. It's like getting the instant results of a national survey. And when the program's done tabulating the re-

James R. Caplan, staff psychologist with Exxon U.S.A., doesn't believe that a management training program can make an effective manager out of a clod.

sults, it compares the three groups of answers in a color bar graph on the screen."

The rating game

The Thoughtware programs are designed for the IBM Personal Computer with at least 128k of memory and a color board. Two things that strike you as you use the programs are the extensive use of color graphics to illustrate each point and the way the software works to solve management problems currently facing you. Essentially the programs work like this: You rate

your own management skills by answering a questionnaire. The people who work for you also rate your abilities. They do this by answering the same questionnaire on a second program disk. The identities of the respondents remain anonymous.

Once the program has recorded the data on your management abilities, it asks you to describe a current work situation over which you have management responsibilities. You describe your intentions, the nature of the task, the people involved, and the

time frame in which you have to work. The program meshes the data and comes back with a plan of action such as, "Because you have decided that those involved have the ability and that the situation is not urgent, you should use participation to deal with the situation in order to achieve results."

But the responses and action plans are not absorbed by merely reading text on a computer monitor. Virtually every screen is accompanied by a graph. The program's main menu is called a Thoughtree—each section of the software appears like a flowchart.

The results of all surveys and each management point is illustrated with a graph or a flowchart showing you how to get from point A to point B.

"What we are trying to do with this concept is not just computerize what's done in a group training session," says Thoughtware president Jack Levine. "We want to put training out where the manager is so that it's at hand for him to use to improve his skills."

That's the value of management training software. It breaks the group

Thoughtware president Jack Levine says the value of management training software is that it lets you learn at your own pace.

stigma by letting you tackle issues at your own pace. The peer pressure is gone. You skip over areas of strength and focus on your weaknesses. You can work on a concept until you've got it right and you can review any section if you need a quick refresher course.

"We've designed the software so you don't have to spend three or four hours at a crack going through it," explains Levine. "You start with a worksheet where you enter a specific problem from the job. Then the software helps you build a plan which you can use for a real-life situation."

James R. Caplan, staff psychologist with Exxon U.S.A. in Houston, is evaluating management-training software to be used by Exxon executives. "A good piece of software must be tool oriented and give you something specific to take away from each learning episode," he explains. "And in order for it to be effective, the user must control the pace or any computerized instruction becomes boring fast."

Caplan believes any management training program should bear this label: *Warning, this product will not make an effective manager out of a clod*.

"What you're trying to do with training software is to identify your strengths and focus your talents to achieve realistic goals," he says. "No matter how good the package, you can't turn a mediocre manager into a great manager."

In many Fortune 500 companies, management training has met with stiff resistance among top executives. For one thing, top managers have little time for it. And few managers want their peers to know they might

need training. The battle among corporate trainers, in fact, is now largely focused on getting top executives to use computers at all.

Syntex Labs, headquartered in Palo Alto, Calif., has about 60 regional sales offices spread throughout the country. The mix of Syntex sales managers involved in computing mirrors the situation at most Fortune 500 companies. A third of them went out and purchased personal computers on their own. Another third, with a little encouragement from the training department, are poised to take the leap. And another third are adamant in resisting computers.

"Getting managers to use personal computers is vital in a far-flung sales organization such as ours," says Monte Andress, manager of professional development for Syntex Labs. "With personal computers in the sales offices, it allows us to take the training to the manager."

Syntex is just experimenting with the Thoughtware modules but Andress sees some hope that the product can overcome much of the management resistance to training. "It allows the manager to conduct his own training seminar in privacy," he says. "It's far less threatening than a group situation."

For those of you who've chosen not to wait for the corporate training staff to tell you how to compute, picture this. How would you like a piece of software that analyzes both your personality traits and those of an opponent in a business deal? While you're on the phone negotiating, the computer analyzes the personalities of each party. And based on the personality matrices, it will even advise you which party should launch the opening bid and how you should close the deal.

The sales psychology

Human Edge Software, of Palo Alto, Calif., has just introduced a series of three packages called The Negotiating Edge, The Sales Edge,

and The Management Edge that let you assess your own personality and those of either a prospective client, the people you manage, or someone with whom you are negotiating a business deal. The company was founded by James Johnson, a former university psychology professor and computer salesman. Johnson is an old hand at using computers for psychological research. He was one of the founders of Psych Systems, Inc., a company that sells computerized diagnostic systems to psychiatrists and psychologists.

"Some people grow fascinated with computers because they can do word processing or accounting," says Johnson. "The only real desire I have to play with the computer is to explore its psychological potential."

When Johnson worked as a manager with Psych Systems, he realized that his three most important activities were selling the product, motivating his sales staff, and negotiating deals. "I started to think, wouldn't it be great if you could use the computer to classify and compare how different personalities would best interact in these areas," he says.

Johnson put together a team of businessmen, psychologists, and technical writers to come up with the first three Human Edge packages. Currently, the three run on the IBM Personal Computer, but Johnson says he is preparing a version of The Negotiating Edge for Apple's Macintosh. "The mouse technology on the Macintosh makes it the perfect tool for negotiating business deals," he explains. "While you're on the phone, you just keep pushing the button, and the computer will tell you the next move."

As they stand now, the packages are extremely easy to use, yet yield some amazing results. In The Sales Edge, for example, you reply positively or negatively to 80 statements ranging from, "I like to take charge of situations," to "A strong defense is necessary for America's survival."

When assessing your customer's personality, you review a checklist of 50 adjectives and mark those which you feel most closely describe your client. Once you and your customer's personality matrices have been established, the program then categorizes the two personalities and formats a sales strategy based on psychological research indicating the best channels of communication between the two people.

"The important thing about the program is that it is highly interactive

James Johnson, founder of Human Edge Software, believes in using psychology to teach sound managment skills.

and always tailored to a specific business situation," explains Johnson. "Some standard textbooks may tell you to make the sales presentation exciting. But if you have a detailed minded, introverted salesperson, that's probably the last thing you want."
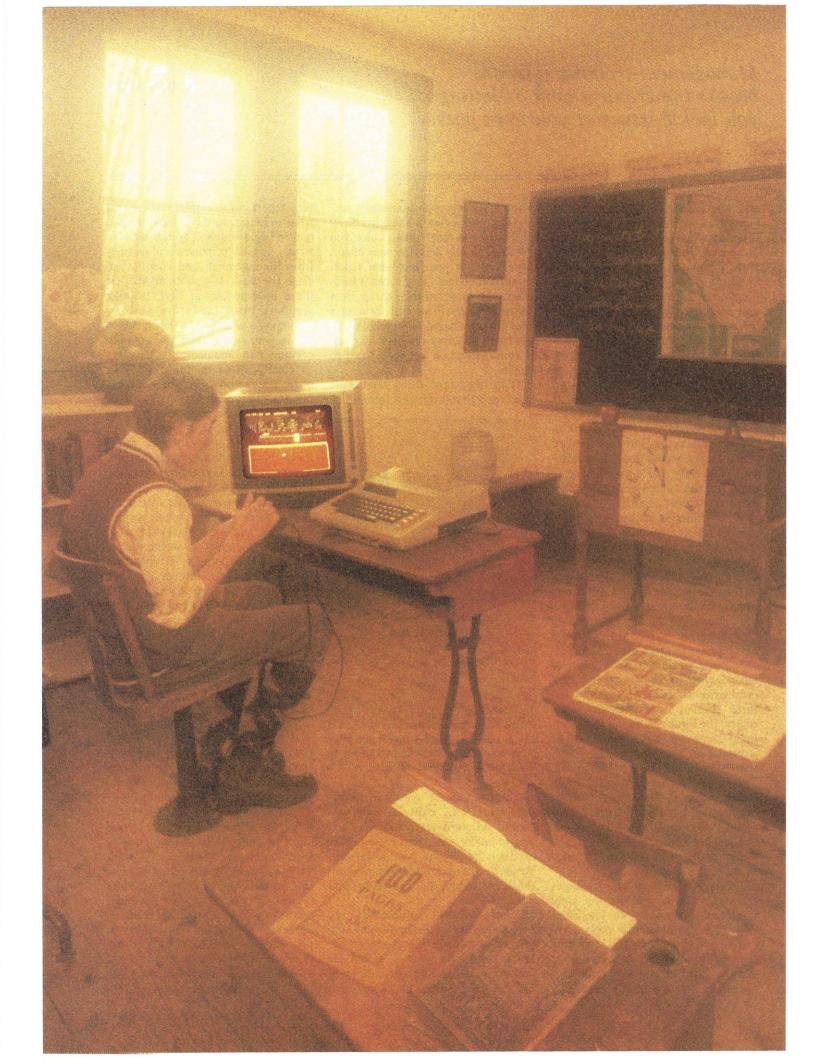
After you've completed the personality evaluations you get a surprisingly detailed strategy report outlining a specific plan of action for making a sale, closing a deal, or managing a subordinate. In a sales stra-

tegy report, for example, you are told what to expect in the sales situation, how to begin your sales pitch, what to stress, how to respond to objections from the customer, and how best to close the deal. It's so dctailcd that it's a little spooky at first. It's like stepping into the future and rearranging a situation so that it comes out in your favor when you actually encounter the moment.

"Really, all we are doing is looking at surface personality traits and making a prediction on how they will interact based on available psychological research," says Johnson. "But these kinds of programs are much more dynamic than standard computer-assisted instruction because they are highly interactive and always tailored to a specific situation."

The sales strategy report begins by giving you an overview of what you should expect to encounter in your customer contact. A typical report will read something like this: "You and your client have much in common. You both like to work carefully on tasks that require attention to detail. Dissimilarities lie in your attitudes toward people. You prefer to work alone and avoid social interactions. Your client also feels uncomfortable around other people, but she depends on them for emotional support. Interactions with her will be most successful when you provide her with encouragement."

The report then takes you through presentation strategies while moving you toward that all important close. To consumate the deal, The Sales Edge gives you a lesson in classic sales strategy while explaining why a particular technique should work with the client. You'll get advice like this from the report: The "Lost Sales Close —If you and your customer are having serious problems reaching agreements, pack up your materials, pick up your coat, and walk to the door. Stop at the door and turn around. Ask the customer what you

How To Keep
Your System Running

It takes more than tender loving care to
prevent a computer "crash"

by Jim Keogh, Associate Editor

An ounce of prevention is worth a pound of cure, especially when it comes to your personal computer. The contents of your computer's memory are vulnerable to all sorts of nasty things which can quickly cause you to lose data. Power failure, power surges, or a faulty chip are just a few of the things that can make your computer "crash" in the middle of a program.

While no one can guarantee that lightning won't strike the utility cable outside your office building or that your computer won't suddenly go kaput, there are some things you can do to minimize the effects of such events.

Your personal computer stores information in two ways: utilizing the on-board random-access memory chips for temporary storage, or using a tape or disk to hold the information permanently off-line. While the information is contained in RAM chips, you are constantly open to the risk of losing all of the data if the power should be lost or drop below the minimum necessary for the chip to retain its memory. In a split second, or nanosecond if you must, and without any warning, all your efforts can be lost forever.

But according to Dan Wager, Midwest regional manager and former hard disk product manager for Mountain Computer, taking a few precautions can mean the difference

between saving most of the data or losing it all. He suggests that, as a standard procedure, you periodically download information stored in memory to a disk or tape. Although it might seem time-consuming to stop several times when preparing a document to copy the contents of the memory to disk, it becomes effective when you consider the time necessary to re-enter the information if the computer's memory comes crashing down.

Although this is the least expensive way of coping with the risk of losing the contents of your computer's memory, there is still another way to ensure that no data is lost. You can install an uninterruptible power supply, such as the one offered by Kalglo of Bethlehem, Pennsylvania.
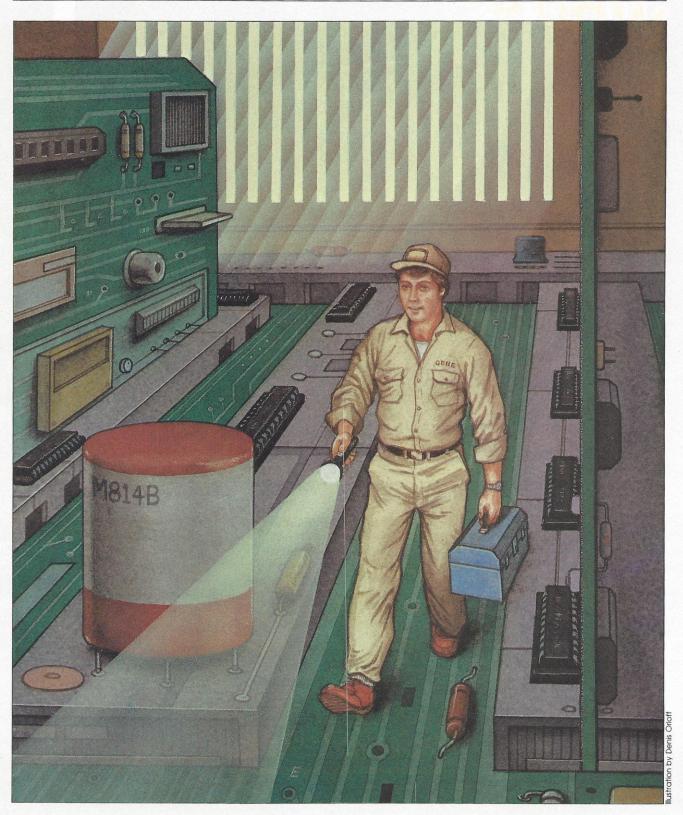
An uninterruptible power supply automatically activates when power from the wall outlet drops below the tolerable limits of your computer. An on-board battery immediately picks up the slack to keep power flowing to your computer. But you can't expect this little data-saver to keep supplying power until the electricity returns to normal. Most of the uninterruptible power supplies designed for personal computers will last for about 15 minutes before the battery discharges.
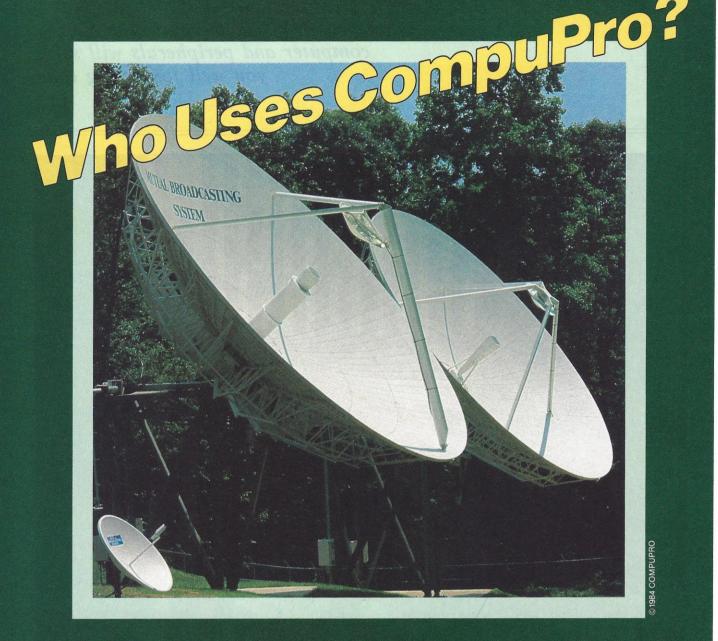
Some areas of the country suffer power reductions more often than actual power outages. Commonly called

brownouts, these power reductions can play havoc with the memory in your computer, and with the computer display. Here again, an uninterruptible power supply is just the right thing for restoring temporary, full power to your computer.

But loss of power isn't the only problem that can wreak havoc with your computer. Public utilities go to great lengths to ensure that a safe and constant flow of power reaches their customers, but there are those moments when electricity along the lines increases beyond the upper range of acceptable limits for a split second. When this occurs, your computer once again becomes susceptible to failure. An increase in power can cause components to burn out.

This, too, can be prevented through the use of a surge suppressor, such as the ZX-5000 offered by Sutton Designs, Inc., of Ithaca, New York. The surge suppressor actually absorbs the excess power before it gets to your computer. Installing a surge suppressor is a fairly straightforward business. The suppressor plugs into the wall outlet and your computer plugs into the suppressor. Some of them let you plug in more than one device—a feature that lets you protect your printer and monitor as well as your computer.

According to Jim Holland, manager of the microcomputer service division of Warner Computer, there's

If you maintain them, your computer and peripherals will serve you well for a long time.

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CIRCLE 109

Beware of static electricity.
Your computer can get zapped, and
you'll lose your valuable data.

**CORPORATE/
BUSINESS**

another power-line condition that can cause your computer system some problems. This involves unwanted electronic signals, commonly called "noise," which does in fact interfere with the operation of your system. Electronic interference as such is familiar to anyone who has watched his television picture flicker while the vacuum or blender was on.

You can prevent this from happening by installing a line filter along the power line to your computer. Line filters are available in any computer store. Some surge suppressors and power supplies have them built in. The line filter is installed in exactly the same way you hook up a surge suppressor.

Check the environment

During the winter months, did you ever walk across the carpeting in the office and touch your desk? Zap! Static electricity. Your computer hates to be zapped, so much so that it will forget everything in its memory at the time of zapping.

Static is caused by a lack of humidity in the air. As fate would have it, there are remedies which will reduce the chance of you shocking your computer. According to Holland, the quickest approach to combat static is to spray the area around your computer with anti-static spray, available at any computer store or electronic shop.

If the low humidity continues for several days, you should think about buying an anti-static mat. It's a heavy sheet of rubber which you put under your chair. A wire extending from the mat is attached to the same ground as your computer. As long as you only touch the computer while you are on the mat, static will be isolated from the computer.

But for a more permanent solution to the static problem, a humidifier should be installed. By monitoring the moisture in the air and making the necessary adjustments to the humidifier, you can keep the air in the office properly moist and eliminate the problem of static electricity.

According to Wager, most personal computer equipment will operate without any moisture-related problems if the humidity in the air around the machine is between 8 percent and 80 percent.

Humidity isn't the only environmental problem that can affect your system. Excessive heat can cause chips to burn out. Although any computer will begin to act up if the temperature in the office goes much beyond 110 degrees Fahrenheit, packing a computer with expansion circuit boards can increase the temperature inside the machine beyond the temperature of the room, making it even more vulnerable to heat problems.

The least expensive way of keeping your computer cool is to install a fan, such as the System Saver by Kensington Microware, Ltd., of New York City. The fan will circulate the air inside the computer to keep it within a safe operating temperature.

Floppy disks can also be drastically affected by temperature. If floppy disks are left in temperatures above 110 degrees Fahrenheit, they may warp. Asif Khan, vice-president of operations for Rana Systems, points out that the read/write head of the floppy disk drive must run smoothly on the surface of the disk. A warped disk will prevent the drive head from staying in contact with the entire surface of the disk, causing a read error.

Temperatures below 32 degrees Fahrenheit can also cause problems for floppy disks. The disks expand and contract with the surrounding temperature. If the temperature drops below the safe operating range, the disk could again fall out of the specifications expected by the drive head and cause a read error.

Smoke gets on your disk

You know smoking is bad for your health, but did you know it can also harm your floppy disks? According to Khan, your computer can probably survive a smoke-filled room, but your disks can become victims of the fallout.

Floppy disks are very susceptible to dirt and dust. Smoking near your disks only concentrates the amount of this debris in the air around them. If you leave your disks exposed, it won't take long until the dirt finds its way through the holes in the disk jacket and onto the surface of the disk. Holland points out that since the drive head clamps down on the surface of the disk, it can grind the dirt into the disk as it rotates.

In addition to not smoking, there are other things you can do to reduce the risk of dirt attaching itself to your disks. Computer professionals recommend that you keep floppy disks in their paper sleeves and store them in a disk container when they are not in use. Don't leave the disk lying on the desk while you're using another disk. The more the disk is exposed to the air, the greater the chance that dirt will find its way onto the disk surface.

A good way to reduce the amount of dirt in the air, especially if the computer is operated by a person who smokes, is through the use of a table-top air cleaner. The dirt in the air around the computer will be drawn into the air cleaner and pass through a filter which catches dust particles.

A little care

If you maintain them, a personal computer and its peripherals can serve you well, without failure, for a long time. According to Apple Computer, a floppy disk drive will probably last 10 years or more. Dan Wager at Mountain Computer reports that a typical hard disk will last through 11,000 hours of operation. A spokesperson from Epson states that a print head, which is the major component in a printer, will last about 100 million characters, and then can be replaced. The only maintenance the computer itself requires is a periodic vacuuming of dust.

*You know that smoking is bad
for your health. But did you
know it's bad for your computer?*

A hard disk drive also involves very little maintenance. Wager recommends that you check the cables leading from the computer to the drive to make sure they're not twisted or placed under any stress. He also warns that you be careful not to drop the hard disk when you're moving it.

According to Apple's spokesperson, the only item that needs looking after on a floppy disk drive is the head alignment. He suggests that the alignment be checked by a technician every six months if the drive is used heavily, or once a year if you use it only occasionally.

Printers, on the other hand, require a little more maintenance than most computer equipment, primarily because they're a combination of electronic and mechanical components. Epson's spokesperson suggests that you periodically clean the platen with ink-cleaning liquid, available in any office supply store or from your computer dealer. Through normal wear, ink from the ribbon will find its way onto the platen and could cause ink marks to appear on the back of the paper.

Breakdowns

So now that you know the basics, and follow them, will your system run without trouble? Well, there's no guarantee. Like any man-made device, computers, disk drives, and printers wear. However, chances are that if your system operated without mishap for the first 90 days after you brought it home, its first date with the repair service will be long after that.

But how long can you expect to have your disk drives before they need looking into? According to Khan, between 8 and 12 percent of all disk drives come back for repairs, and half of those are returned due to operator problems. He states that traditionally, the disk drive owner has difficulty properly installing the disk drive controller circuit board in his personal computer. He either forgets

to turn off the power to the computer before installing the board, or simply fails to read the instructions that come with the disk drive.

Other returns are due to read/write head alignment problems or chip failures in the drive itself, or on the drive controller circuit board. How long will these repairs take? This will depend on the problem and where you go for servicing. Repairs—such as for a head alignment problem—that can be performed by your local service center may tie up your drive for about a week. However, if you're one of those unlucky owners whose drive is in need of more serious repairs, the drive may have to be sent to the manufacturer. If so, prepare yourself for a two- to three-week turnaround time.

Floppy disk drives are not the only peripherals which you can expect to fail. Hard disk drives can also break down. But, as with floppy disk drives, if your hard disk has worked for the first few weeks without giving you any trouble, it should last through 11,000 hours of operation, according to Dan Wager.

But if it does break down, as with floppy drives, it's likely the problem can be traced back to the operator. Dan Wager points out that about 75 percent of all the repairs are caused by improper installation of the hard disk controller card. Many times, the operator will cause the controller card to short out by installing it with the computer turned on. Some repairs do involve chips and other components in the hard disk drive.

A small number of repairs are due to damage to the disk itself. This usually involves the operator dropping the drive or letting it hit a table or filing cabinet while it's being moved. When this occurs, the read/write head inside the drive scrapes the surface of the disk. You may not notice any difficulties right away, but, according to Wager, when the scratched portions of the disk are being used over time, the data desig-

nated for those areas will be garbled and lost.

Hard disk repairs traditionally take up to a couple of weeks if it is repaired at your local computer repair facility, or up to four weeks if the drive has to be sent back to the manufacturer. Some hard disk manufacturers, such as Mountain Computer, will send you a replacement drive as soon as the service call is received, which amounts to a two-day turnaround. When your malfunctioning hard disk is received at the factory, it is repaired and used as a replacement drive. The memory, of course, is erased before it is sent out again.

"Hold on," you say. "What about the information stored on the disk?" Well, in all honesty, you might lose all the data contained on the hard disk. Whether you will or not depends on the type of problem found in your disk drive. Wager reports that if the failure is due to components other than the read/write head, the memory can be saved; otherwise, say goodbye to your data.

To ease the pain of having a hard disk failure, Wager recommends that you make backing up all the information stored on a hard disk part of your normal routine. If you are using a 10Mbyte or more hard disk, the easiest way to back up data is through the use of a tape drive system. For a lower memory drive, floppy disks are more cost-effective.

The cost of repairs

Having your computer equipment repaired can be a trying experience, and one that frequently requires you to dig down deep in your pocket to settle the repair bill. Repairs cost about $45 an hour in the shop and $65 an hour for house calls. At some shops, the hourly charge begins when the repairman leaves the shop and ends when he returns. This, of course, doesn't include the charge for parts. If they have to come to you, you can expect to pay a charge of

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about $65, depending on the repair shop you deal with.

Why are repairs so expensive? Holland points out that the prime expense involves tracking down the problem. He claims that 95 percent of the repair time is spent locating the difficulty. Many computer equipment manufacturers give little support to service centers in the way of information about repairs.

There are two approaches regarding the servicing of computer products: chip replacement, or circuit board replacement. Frequently, a malfunctioning computer or peripheral can be up and running with the replacement of a couple of computer chips. But which chips are bad? The repair shop can use sophisticated diagnostic equipment to track down the problem; however, these are expensive and there are very few service representatives who know how to use them. Managers of repair services also question whether the equipment is cost-effective.

Many firms use a chip replacement method to track down hardware problems. With this method, recommended by several computer manufacturers, each chip is replaced with a chip that is known to be operating properly. Through trial and error, the malfunctioning chip is found and the computer is placed back into operation. Experienced technicians, of course, have developed their own short cuts in finding the problem, so that not every chip must be removed and replaced. Those chips that are known to be troublesome are the first checked by the technician.

Although at first this appears time-consuming, this method can be a cost-effective way of repairing the equipment, since the replacement chip usually costs less than a dollar. But sometimes this technique isn't possible. Some manufacturers use chips which are soldered directly onto the circuit board, making the replacement of each chip very time-consuming.

Manufacturers who solder their chips to the boards recommend that the local repair shops isolate the malfunction to a particular circuit board and replace the board, or send the board to the manufacturer for repair. According to a spokesperson for Apple Computer, many computers can be quickly divided into a few major circuits: expansion boards, the motherboard (main circuit board in the computer), and the keyboard. By replacing each of these circuits with known working circuits, the repair can usually be made within an hour.

How are you affected? This will depend on which circuit board has malfunctioned. The service rep can probably isolate and replace the board in an hour, but the cost of the replacement board can range anywhere from $50 for a disk controller card to over $700 for a main circuit board. When compared to replacing a chip or two at less than a dollar apiece, buying computer equipment with easily replaceable chips can look attractive. However, many service professionals claim that using either method can be a gamble. Finding the malfunctioning chip can take several hours, which can quickly make the price of a replacement circuit board more desirable. Then again, the service rep may find the problem within an hour and replace the chip.

Extending the work life

To reduce the risk of finding yourself facing a few hundred dollars in computer repairs, almost every service shop offers a service contract which, for an annual fee, will take care of most of your service needs. Besides local computer dealers, there are a few national service companies such as Bell & Howell, Xerox, and Serviceland, which have similar offerings.

Services covered under such an agreement will vary, depending upon your needs and the capabilities of the repair shop. For example, many of the nationwide service organizations

offer more than a promise to get your computer back in working condition. These agreements also include installation services, from unpacking a computer, through a test run and preventive maintenance to the equipment. The maintenance or service contract fee also includes the cost of labor during normal working hours, and the necessary replacement parts. There is usually an extra charge for service before 9 a.m. and after 5 p.m. And don't expect to receive new parts. Many of the contracts state that replacement parts may be refurbished or reconditioned and that the part that has malfunctioned becomes the property of the service company.

How much will it cost? The annual service contract fee will greatly depend upon the equipment that you want covered, and the amount of service the company intends to give you during the year. Many local repair shops offer just the repair service (parts and labor), which can run you about $150 a year. For more complete service, you can expect to pay a few hundred dollars. But the agreement doesn't have to cover all the computer equipment. Some national service companies will permit you to just cover the CRT, for example, for under $40 a year, and this can be as low as $25 a year if you are willing to bring the unit to the shop.

Are service contracts worth the fee? The answer will depend on your experience. For the computer owner whose main circuit board failed and had to pay close to $1000 for the repair, the service agreement was well worth the $150 annual fee. But those owners who have not realized any problem with their equipment for several years may feel the service contract fee is a waste. Like any insurance policy, a service contract is a gamble and the odds are probably not with you. However, if your computer comes crashing down and you're facing an expensive repair, the service contract is a friend you may find to be too valuable to be without. ∎

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Connected! A Buyer's Guide On Modems

Once you've decided to buy a modem you need to know what to look for

by Paul Bonner and James Keogh, Associate Editors

I n the somewhat preachy world of computer magazines, there seem to be two distinctly different approaches to dealing with the subject of modems. First, there are those articles that try to dazzle you with the technical, rather than practical, details of baud rates, Bell protocols, and transmission modes. Then there are those that tell you about Fast Freddy Floom, and how he transformed his business from a real dog into the hottest stock on the Philadelphia-Baltimore-Washington exchange thanks to the new worlds that modeming opened up for him.

That's not to say that modems can't do the same for you—they really do have a tremendous ability to extend the power of your computer—but if you're in the insurance business, it probably doesn't do you much good to know how Fast Freddy optimized his soybean recycling firm with a modem. You just want to know why modems should be considered important.

So, you may want to consider that while the Fast Freddy type of article may make for more interesting reading and it may be a bit more persuasive when you're trying to weigh the pros and cons of spending your hard-earned buckerinos on a modem, you shouldn't let all those boring technical details you find in the other articles pass you by. They really can be useful, but you have to know

more than their definitions. Knowing what a 212A protocol means as opposed to a Bell 103 may help you decipher a salesman's spiel, but it doesn't let you cut him off with a wonderfully self-assured statement like "I already know what I want." To be able to do that, you have to know how the difference in those details affects your use of your modem, and hence, upon it's real value to you.
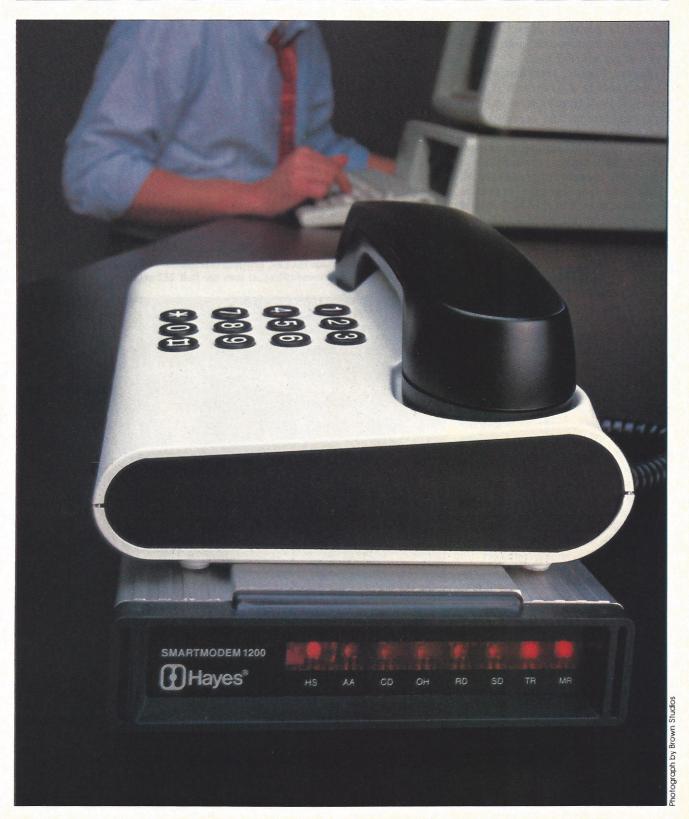
To help you make sense of the masses of articles and information, we're going to assume that you've already read the prerequisite 40 or 50 stories about how modems are the greatest thing since sliced bread, and about how they'll change your life so much for the better that the rabble in the street will bow down before you—and that having finally decided to take the plunge and buy one, all you really want are some hard facts to fill in the gaps in your consciousness about exactly what you should look for when you make your modem purchase.

In order to catalogue the technical and practical details that you, as a prospective modem-buyer needs, we talked to top people in the modem industry, asking each of them, "What advice would you give a friend who wanted to buy a modem?" Besides getting the obvious first answer "Well, we feel that the one our company manufactures is the best," they were able to provide us with some

valuable insights into what really counts in a modem.

The first thing you should decide when you're contemplating the acquisition of a modem, they said, is baud rate—the speed at which the modem transmits and/or receives data. This is of primary importance since it has the greatest effect on how much you'll end up spending for your modem. But, our experts agree, it's also a rather simple decision to make.

First off, right now you're pretty much limited to two choices: 300 bits per second (or baud) or 1200 bps. (There are slower speeds, but they're *very* slow, and higher speeds are just beginning to appear. The important thing to remember is that 1200 bps is four times faster than 300 bps.) And even that choice becomes pretty simple. As Robert Stitt, vice-president of marketing for Ven-Tel Inc. in Santa Clara, Calif., says, "If you have a lot of time, or very little data, a 300 bps device may make a lot of sense for sending or receiving data. But if you don't have a lot of time, or if you're impatient, or if there's a lot of use on your port so you want to reduce the amount of connect time, or if your call is very expensive, or if your operator's time is expensive, you may want to increase the data rate. It's fine to say, "I have more time than money, so I'm willing to put up with slowness if I can spend only $100 instead of $500 for a modem," but very

Modems have a tremendous ability to extend the power of your computer.

shortly the economic impact of your decision overcomes you, and you go out and get a faster unit."
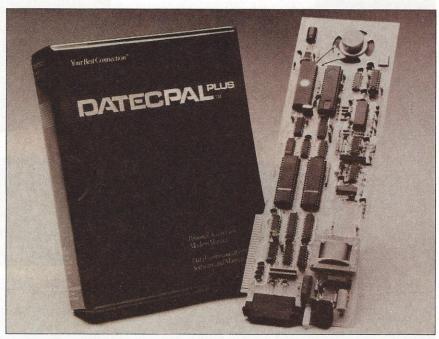
Bayard Kessler, president of Novation, Inc. in Chatsworth, Calif., says that the advice he gives on baud rate depends on the computer on which the modem will be used. For an Apple II or other computers in that price range, Kessler recommends a 300-baud modem upgradeable to 1200 baud, but for more expensive machines, such as an IBM Personal Computer or an IBM-lookalike, Kessler recommends 1200 baud. He feels it's mainly a matter of economics—that it may be difficult to justify the expenditure of $500 (an average price for a 1200-baud modem) for a peripheral for a $1000 computer when there's a $100 alternative (the average price for a 300 bps modem) available, but that for a $4000 computer the ability to maximize it's efficiency for an additional $500 is one that shouldn't be missed.

Other people in the industry are less willing to consider a 300-baud modem a viable alternative. Greg Ferguson, director of marketing for Microcom in Norwood, Mass., says, "As far as I'm concerned, the way the technology is moving today, just about everyone should be moving toward 1200 baud." A little insight as to why this is so comes from Gary Sorkis, national sales manager for Bytcom in San Rafael, California. Sorkis says there's an important economic reason for opting for a high-speed modem: "The cost of telephone lines and telephone usage is ever-increasing . . . charges for local service calls, which are commonly used for computer communications (for instance, to access Telenet or Tymnet) will increase." Thus, if you can minimize your connect time through using a high-speed modem, you may end up saving money each time you connect.

Robert Stitt agrees, adding, "If you're thinking about a modem you should be thinking about 1200 baud.

The PAL 212 modem from DATEC provides communications capabilities for the IBM Personal Computer and compatibles. It uses the Bell 212 protocol.

DATEC's PALPlus modem includes the Crosstalk communications software package. It includes a speaker with volume control, and operates at full- and half-duplex.

The slower modems are maddeningly slow. The advantage of a 1200 bps modem for most purposes is that it gives the sensation of real-time computing. If you hit an 'A' on the terminal, the echo you get back is almost simultaneous with your hitting the key. The screen refresh rate is acceptable. At 300 bps, that simply isn't true." He concludes that, "The

difference in cost of a 300-baud and a 1200-baud modem is not enough to justify going at 300 bps."

Once you've decided on the baud rate, you have another simple question to ask yourself: which transmission protocol the modem you buy should use. Greg Ferguson explains that: "A protocol is simply a set of rules by which computers agree to

communicate. Just like you and I agree to communicate in English and use certain mannerisms to highlight things, computers need to decide how to communicate. They need to decide on the speed by which they're going to communicate, and whether they're going to have flow control or no flow control . . . Probably the most important thing to know is that the protocol lets them correct errors so that you can transfer error-free data between computers. They have to agree on parity (the communications error-checking), and there should be data verification, so if what was being transmitted from one end is not the same as was received on the other end the data is retransmitted."

Robert Stitt emphasizes that it's important that the modem you select uses a standardized transmission protocol. "The modems that are made in the U.S. are primarily modems that use the protocols established by the modems manufactured by Western Electric for AT&T. The rest of the world does things a slightly different way. They use frequencies and modulation schemes established by a treaty of various countries. The name of the treaty organization is abbreviated to CCITT. The most popular modem in the U.S. for dial-up use is a 212A, and that's 1200 or 300 bps, full duplex, asynchronous or synchronous. The equivalent of that unit in the rest of the world is called a V.22. It uses a different modulation scheme and different frequencies. The two protocols are not compatible. If you call up a V.22 and a Bell 212A, they don't work together."

The reason why it's important that a modem uses an accepted standard protocol, Stitt says, is that "Unless there is a consensus of what the standard should be, it never becomes a popular technology. The best example of that was the Vadic 3400 technology, which was proprietary to Vadic. The moment that Bell came out with the 212A and it became the de facto standard in this country, the

Ven-tel's PC Modem 1200, an internal 300/1200-baud modem for the IBM Personal computer and compatibles, is available in full- and half-card.
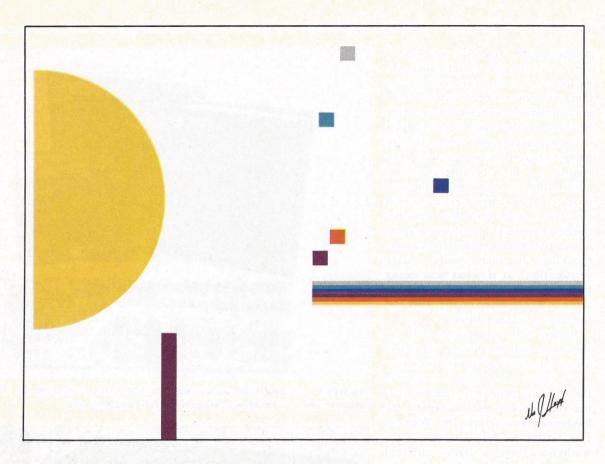
The 1200 Plus from Ven-tel is a 300/1200-baud modem with auto-answer, auto-dial, and internal speaker features. It can detect the speed of incoming calls.

3400 technology started dying. It's all but gone from the world these days." Gary Sorkis adds, "You need . . . a modem that meets a very popular specification because that will mean there are more people to talk to . . . You might have the best modem in the world, but if you can only talk to 10 other people, it doesn't give you the benefit of a modem."

Sorkis adds that, "The most popular protocols in the consumer electronics field are the Bell 103 for 300 baud and the Bell 212A for 1200 baud. A Bell 212A modem actually has many different baud rates from 0 to 300 baud in 5-baud increments, and then 1200 baud. It will answer incoming calls in either 300 or 1200 baud, depending on the baud of the

Data Spectrum™

You have basically two choices of modem speed— 300 and 1200 baud.

originating modem." Because of that versatility, Sorkis says, "The Bell 212A protocol is the most popular type of modem. There's an existing base of 1.5 million users which is growing at a rate of over 500,000 a year."
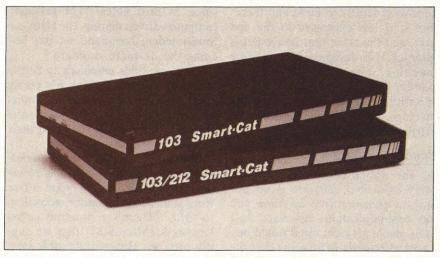
So, the question of protocols really boils down to baud rate and versatility. If you've decided that 300 baud meets your needs, a Bell 103 modem will do the trick for you. If you want 1200 baud, or the versatility to use either, you need a Bell 212A modem. No other protocol has become standardized enough to ensure that you'll be able to talk to whomever you want with your computer. It's as simple as that.

Internal/external

The next question to consider before selecting a modem is whether to buy an internal modem to be mounted on an expansion board within your computer, or an external modem to be driven with a serial card or port. Here our experts disagreed quite a bit, supplying eloquent arguments for both internal and external modems.

Greg Ferguson states that, "For some people, the stand-alone modem is better because there are no in-board modems offered on the particular computer that is being used. A specific machine may be designed with no internal slots or without the capability for an internal modem. An example is the Macintosh. So that will lead certain customers to a stand-alone modem . . . In addition, if the user plans to upgrade his personal computer in the near future, he doesn't want to buy a specific modem intended only for the computer he's planning to move away from. Or maybe he has several computers and likes to carry a modem back-and-forth."

Gary Sorkis agrees, saying, "I'm a great fan of stand-alone modems. If you look at trends in consumer electronics, it's going modular for flexibility and for diagnostic ease. Let's

The Smart-Cat 103/212 modem from Novation works with an RS-232 interface and features auto redial and disk-to-disk transfer.

say your computer goes out, you need a new computer. You don't have to worry about whether a stand-alone modem will fit into the computer you buy."

Also arguing in favor of stand-alone modems because of the temporariness of computers is Robert Stitt, who says, "The useful life of a modem is probably greater than the useful life of a computer. If I buy an Apple or an IBM Personal Computer or a North Star, I'm reasonably sure that I will have a different machine five years from now. If I buy an external modem to fit with that machine, I can probably use it with the next machine I buy. But if my modem is internal, I'm forced to sell the modem with the machine, and I would not expect to get very much for the modem, and I would not expect to get any reasonable differential for the machine with the modem as opposed to the machine without the modem as a piece of used machinery.

"The price differential between an internal modem and an external one is almost nominal," Stitt adds, "It's in the neighborhood of $100. But the commitment to an internal modem leaves you with no flexibility in moving that piece of equipment to a different 'gender' machine.

However, Stitt adds, "There are some good reasons (why people opt for the internal modem). If you don't want a lot of desk clutter, or if you are supplying equipment for use by someone else, and he doesn't need to know that there's a modem attached to it—all he needs to know is that it's a piece of office equipment or desk equipment that has a functional purpose—then maybe you should buy an internal modem."

Pointing out another possible advantage of internal modems over external modems, Bayard Kessler says it (an internal modem) allows the modem manufacturer to control all components of the communications system, as opposed to the situation with external modems where the modem manufacturer doesn't know what serial card, cable, or software will be used with the modem. As a result, Kessler says, the modem manufacturer can put together an optimized communications system for the machine on which the modem will be used, especially if, as does Kessler's firm, Novation, the manufacturer includes a communication software package with the modem.

Greg Ferguson agrees, saying, "An internal modem allows for a couple of super features: One is that it's less ex-

*If you have a $1000 computer,
you may find it difficult to
justify spending $500 for a modem.*

pensive generally to build and therefore it is less expensive to the end user, and the other that because it is internal, it is designed for a specific machine. The manufacturer can bundle communications software specifically for that modem and that machine, taking advantage of certain attributes of the machine."

Bundled systems

As the above comments suggest, communications software is an important consideration anytime you buy communications hardware. Just as no one in his right mind would buy a computer without knowing that the software he wants does in fact run on the computer he buys, you shouldn't buy a modem with the intention of calling up The Source, or communicating with a friend's computer, or accessing the data on the hard disk in your office from your home computer, without ensuring that the software necessary to make your modem do those things is available. That's not much of a problem if you have a manual-dial, acoustic coupler modem, but if you've got one with auto-dial and auto-answer, your software had better know and understand the modem's command set.

In fact, Greg Ferguson says, "People shouldn't look for modems. They should look for communications ... because the most important aspect in the full solution to communications problems is not hardware. Most of the intelligence now is in the software. It's the friendliness of the user interface and the design of the software which is really going to give benefits to the end user. ... It's very important that people consider what the software (available for that modem) can and can't do."

According to Robert Stitt, "If your software is expecting a (Hayes) Smartmodem and you want to use the dialing capability of the modem, you have to have a modem with the Smartmodem command set." Luckily, that isn't too difficult these days,

since, as Stitt notes, "For personal computer-driven dialing, the (Hayes) Smartmodem command set has become the de-facto standard."

Ferguson adds emphasis to Stitt's remarks, saying. "I think it's pretty important for people who are interested in using communications software for the Apple or IBM that their modem be Hayes-compatible ... "

Software is also the key for special-purpose modem uses—such as accessing that hard disk in your office from your home computer, according to Stitt. "There's a program called Crosstalk (MicroStuf) that we supply with our Hayes-compatible integral modems for the IBM Personal Computer. It allows you to call in, assume the position or configuration of a terminal, and do work. Or you can simply retrieve the file you want, write it to your own disk, and then do work locally."

Data reliability

Okay, so now you've decided the baud rate question, and the protocol question, and the software-support question, and the internal/external question, and you look out at all the modems in the world, and what do you see? Lots of modems that meet your needs. How do you cut down the list?

One way to do it is to check out their reliability. The truth is, all 1200-baud modems are not created equal. Some are very reliable, while others are prone to turn your precious data into egg salad. Assuming that you'd prefer one of the former, more reliable alternatives, how do you make sure that the modem you buy is one of them?

Stitt says that "You need to ask for specifications on bit error rates. They're available if you ask for them. Some manufacturers publish them with their specifications. Plus, your computer dealer can usually tell you which manufacturers have higher bit error rates than others. You obviously want to avoid these units.

Kessler agrees that data reliability is important, but doesn't think specifications will help you much in determining the reliability of a modem, because "Everybody in this business specs about the same." However, he suggests several ways to increase your chances of buying a reliable brand of modem. One is to ask the people you know who have modems whether they have problems. Another, he suggests, is to avoid buying "the cheapest modem on the market from a brand-new manufacturer." Finally, he suggests that you attend a computer trade show and ask modem dealers or manufacturers there to demonstrate their modems for you. He says that since booths at such shows are usually supplied by temporary phone lines which are likely to have much more noise and less reliability than the ones supplying your home and office, if a modem can perform well under those conditions, it will more than likely be quite satisfactory for your needs.

Gary Sorkis lists a number of additional features that he considers important in a modem. Among them are common ones like auto-dialing and software disconnection—the ability to have the modem "hang up" the phone—and some less common ones, such as true dial tone connection. He explains that "The modem will go out and listen for a dial tone and then the modem can dial 9 to get an outside line, and then wait for a secondary dial tone. That's an important feature to enable a modem to work with a PBX system. Many modems don't in fact listen for a dial tone. The manufacturer just builds in a five-second delay, and expects that after five seconds the dial tone will be there. We have true dial tone recognition, and we wait for a tone as many times as is needed. For example, once you get an outside line you can then dial an MCI number, and then when you get another dial tone you dial your account

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1212-ST	APC	$495 R	DC	E	103, 113, 212	AA
1212-AD1	APC	$595 R	DC	E	103, 113, 212	O/A
1212-AD2	APC	$695 R	DC	E	103, 113. 212	O/A
ATARI 835	ATA (all)	$279.95 R	DC	E	103, 113	O/A
1030	ATA (all)	$130.95 R	DC	E	103, 113	O/A
AT&T 103JR	RS-232	$1190 R	DC	E	103	O/A
BACUS AC 312	RS-232	$145 R	AC	E	102	A
BIZCOMP 1012 IntelliModem	APC	$549 R	DC	E	103, 212	O, A
1022 IntelliModem	APC	$549 R	DC	E	103	O, A
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CAMPBELL SCIENTIFIC DC103A	RS-232	$450 R	DC	E	103	A
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370E2-42 Phonem	APC	$277 R	DC	E	103J	O/A
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AutoVic	COM 64, VIC 20	$149.95 R	DC	E	103	O/A
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COMPUTER DEVELOPMENT CORP. ET	RS-232	$495 R	DC	E	103	AA
ETC 2103	RS-232	$1295 R	DC	E	212A	AA
CONCORD 212	APC	$720 R	DC	E	212	O/A
DATEC PALPlus	IBM PC, XT and Compatibles	$599 R	DC	I	212	O/A
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Apple = APL (II, II+, IIe)	IBM = IBM (PC, XT, PCjr)	RS-232	Half Duplex = H
Atari = ATA (all)	Most Personal Computers = MPC	Internal = I	Pulse Dialing = P
Commodore = COM (64, VIC 20)		External = E	Tone Dialing = T

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Y	1200	F, H	P, T	N	Asynchronous board included
Y	300, 1200	F, H	None	N	None
Y	300, 1200	F, H	P, T	N	Stores 16 numbers up to 37 digits each; has integral speaker
Y	300, 1200	F, H	P, T	N	Automatic log-on; two-level security
Y	300	F, H	P, T	TeleLink II	Software can store numbers
Y	300	F, H	P, T	ModemLink	Can be used as a terminal emulator
N	300	F	P	N	None
N	300	F	P, T	N	BASIC unit
N	0-300, 1200	F, H	P, T	N	Repeat-dial on busy signal; programmable auto log-on; full self-test diagnostics; automatic speed detection
N	0-300	F, H	P, T	N	None
N	110, 300, 1200	F, H	P, T	PC IntelliCom	Status detection; audio monitor; programmable log-on sequence
N	0-300, 1200	F	P, T	N	Two-year warranty
N	300	F	P, T	N	Battery operated
Y	300, 1200	F	P, T	Crosstalk	Electronic call progress tone detection; stores 52 32-character telephone numbers
N	0-300	F	P, T	N	Local analog loop-back; remote digital loop-back
N	0-1200	F, H	P, T	N	Local analog; local self-test; remote self-test
N	0-300, 1200	F	P, T	N	Auto redial; single-keystroke dialing; end-to-end self dialing; local analog; remote digital
Y	0-300	F, H	None	N	Simultaneous voice and data
Y	300	F, H	None	N	Simultaneous voice and data
N	1200	F	P, T	N	Can be used on two-wire leased line
N	300	F, H	P, T	N	Voice-data switch; two-wire leased line
N	300	F, H	P, T	N	One-number dialer; automatic activation of exclusion key
N	300	F, H	P, T	SnackPac, Dow Jones membership	None
N	300	F, H	P, T	VIC Term I Auto Term	Auto answer/auto dial
N	300	H	T	N	LED lights
N	0-300, 1200	F, H	P, T	N	Voice/data switch; encryption chip (optional)
N	0-300, 1200	F, H	P, T	N	Printer buffer; encryption chip (optional)
N	1200	F	P, T	N	Automatic adaptive equalizer
Y	0-300	F, H	P, T	Crosstalk	Speaker with volume control
Y	0-300	F, H	P, T	N	Speaker with volume control

OPERATIONS:
Answer Only = A
Auto Answer = AA
Manual Answer = MA

Manual Originate = MO
Originate/Answer = O/A
Originate Only = O

Types:
Direct-Connect = DC
Acoustic Coupler = AC

COMPANY/ PRODUCT	SYSTEMS	PRICE	TYPE	INTERNAL/ EXTERNAL	BELL PROT.	OPERATION
DEVELCON ELECTRONICS 6212 Smartmodem	APC	$495 R	AC	E	212A	AA
8212	APC	$650 R	DC	E	212A	O/A
DIGITAL EQUIPMENT 100 Modem Family	RS-232	$545-$3045 R	DC	I, E	None	AA
GANDALF SAM 212A	RS-232	$618 M	DC	E	103, 212	O/A
HAYES Smart-modem 300	APC	$289 R	DC	E	103	O/A, AA
Smart-modem 1200	APC	$699 R	DC	E	103, 212A	O/A
Smart-modem 1200B	APC	$599 R	DC	I	103, 212A	O/A
Micro-modem 100	APC	$399 R	DC	I	103	AA
Micro-modem IIE	APC	$329 R	DC	I	103	O/A
INCOMM A1200	RS-232	$499 R	DC	E	212A	AA
Starcom	RS-232	$449 R	DC	E	103, 212A	AA
INFINITE CM2020 Direct Connect Card	APC	$250 R	DC	I	202	AA
INMAC 8071	APC	$595 R	DC	E	212A	AA
INTEGRATED DESIGN ENGINEERING IDE-1200	NCR	$500 R	DC	I	212	O/A
1200 Baud Modem 8070	APC	$445 R	DC	E	212, 212A	O/A
Small Talk 300 Baud 8063	APC	$149 R	DC	E	103	AA
LEXICON LEX 10	APC	$119 R/M	DC	I	103	O/A
LEX 11	APC	$159 R	AC	I	103	O/A
LEX 11B	APC	$199 R	AC	I	103	O/A
LEX 12	APC	$179 R	AC	I	103	O/A
MAGNATEC 407C	APC	$745 R	AC	I	None	A
MFJ MFJ-1232	RS-232	$129	AC	E	103	O/A
MICROCOM RX-1000	RS-232	$895 R	DC	E	212A	AA
ERA-2	IBM PC, XT, PCjr; APL IIe	$429 R	DC	I	212A	AA
MICOM MB80512	RS-232	$550 R	DC	I	212A	AA
MB80514	RS-232	$595 R	DC	E	212A	AA
MICRO-PLEX Versacom 300A	RS-232	$119 R	DC	I	103	O
MULTI-TECH MT212AH (Multi-modem)	RS-232	$549 R	DC	E	212, 212A	O/A
MT2129C Multi-Modem PC MT212PC	IBM PC, XT	$549 R	DC	I	103, 113, 212A	O/A
Multi-Modem IIe	APL II, II+, IIe	$329 R	DC	I	103, 113	O/A
NEC N212DR	RS-232	$795 R	DC	E	103, 212	AA
N103JR	RS-232	$460 R	DC	E	103	AA, MA
NESCO 1200	RS-232	$495 R	DC	I, E	212A	O/A
1030	RS-232	$595 R	DC	E	103	O/A

VOICE	BAUD RATE	DUPLEX	DIALING	SOFTWARE PROVIDED	SPECIAL FEATURES
N	1200	F	P, T	N	Speed dialing; battery back-up; user-friendly commands
N	300, 1200	F	P, T	N	Auto dial
N	1200-9600	F, H	P, T	N	Neither terminal nor system dependent
N	300, 1200	F	P, T	N	Supports 7-, 8- and 9-bit codes; auto log-on; stores up to 52 numbers of 32 digits each
N	0-300	F, H	P, T	N	LED function; external speaker
N	0-300, 1200	F, H	P, T	N	LED function; external speaker
N	0-300, 1200	F, H	P, T	Smartcom II	None
N	110, 300	F, H	P	N	None
N	110, 300	F, H	P, T	Smartcom I	None
N	1200	E, H	P, T	N	None
N	300, 1200	F, H	P, T	N	RS-232 cable included; Hayes-compatible
N	1200	H	P	N	Self-test
N	300, 1200	F	T	N	Test lights on front panel; Hayes-compatible (Smartmodem)
N	300, 1200	F, H	T	N	None
N	300, 1200	F	T	N	Includes RJ-11 cable
N	300	F	T	N	Can be used with standard phone jack
N	300	F	P	N	None
N	300	F, H	P	N	Self-test (loop-back self-test diagnostics)
N	300	F, H	P	N	Built in battery recharger
N	300	F	P	N	Switchable to direct connect on the handset as opposed to wall jack "direct hand-set"
N	0-4800	H	T	N	Has select characters for tone decoding
Y	300	F, H	P	N	Can use AC or battery; works on TTL as well as RS-232
N	0-300, 1200	F, H	P, T	N	Error correction; auto redial
N	0-300	F, H	P, T	ERA-2	Protocol is implemented
N	300, 1200	F	P, T	N	Single internal card
N	300, 1200	F	P, T	N	No battery back-up required
N	300	F, H	P	N	Has optional hand-free headset ($135)
Y	300, 1200	F, H	P, T	N	Auto-dial with commands from keyboard; detects dial tones as well as distant ringing and busy signals
Y	300, 1200	F, H	P, T	Multi-Com PC	Stores up to 20 numbers; fully Hayes-compatible
N	110, 300	F, H	P, T	Y	BASIC compatible; complete menu driven software; Hayes Micromodem-compatible
N	300, 1200	F	P, T	N	Built-in number directory; security password
N	300	F	P	N	Rack mountable
N	300, 1200	F, H	P, T	N	Redials last number called
N	100-300	F, H	P, T	N	Redials last number called; capable of handling TWXT

COMPANY/ PRODUCT	SYSTEMS	PRICE	TYPE	INTERNAL/ EXTERNAL	BELL PROT.	OPERATION
NOVATION APPLECAT	APL II, II+, IIe	$725 R	DC	I	103,, 212	O/A
SMART-CAT/103/212	RS-232	$595 R	DC	E	103, 212	O/A
PC CAT	RS-232	$595 R	DC	I	103, 212	O/A
OSBORNE Comm-Pac	OSB	$155 R	DC	I	103	O/A, AA
PENRIL 300/1200	MPC	$525 R	DC	E	103, 121A	AA, MO
8201-DN	MPC	$795 R	DC	E	201	AA,MO
PRENTICE POP-COM X-100	RS-232	$475 R	DC	E	103, 113, 212A	AA
PROCESSING INNOVATIONS Speech-Aided Modem	RS-232	$50.95	DC	E	202	AA
PROMETHEUS Promodem 1200	APC	$495 R	DC	E	103, 212A	O/A
RACAL-VADIC VI 1222	RS-232	$975 R	DC	E	None	O/A
RADIO SHACK DC-1200	RS-232	$699 R	AC	E	212	AA
RIXON R103J	RS-232	$249 M	DC	E	103, 112, 212	O/A, AA
R212A Intelligent	RS-232	$499 M	DC	E	103, 113, 212A	AA
PC212A	IBM PC, XT	$499 (single port)	DC	I	103, 113, 212A	AA
TRANSEND Apple Modem Card	APL II+, IIe	$325 R	DC	I	103	O/A, AA
PC Modem Card	IBM PC, XT and Compatibles	$549 R4	DC	I	212	O/A
TRI-DATA OZ Guardian 533	RS-232	$750 R	DC	E	103, 212	AA
UNIVERSAL 103 LP O/A	APC	$145 R	DC	E	103, 113	O/A
U.S. ROBOTICS	Information not available					
VEN-TEL PC Modem 1200 Half-Card available	IBM PC, XT	$499 $549 R	DC	I	103, 212A	AA
HP 150 Internal modem	HP 150	$425 R	DC	I	103, 212A	AA
1200 Plus	RS-232	$495 R	DC	E	103, 212A	A
WANG WA3451	APC	$1050 R	DC	E	212A	O/A
WESTERN DATACOM 212 Autodial	APC	$625 R	DC	E	103, 212A	O/A
WorldCom 200	APC	$495 R	DC	E	202	O/A

VOICE	BAUD RATE	DUPLEX	DIALING	SOFTWARE PROVIDED	SPECIAL FEATURES
N	300, 1200	F, H	P, T	Comware	Dial tone detection
N	300, 1200	F	P, T	N	Analog loop-back; programmable
N	300, 1200	F	P, T	Crosstalk	Auto redial; disk-to-disk transfer
N	300	F, H	P	AM-CALL	Supports break/slash return protocol
N	0-300, 1200	F	T	N	None
N	1200, 2400	H	T	N	None
Y	300, 1200	F	P, T	N	No hardware switches; Hayes-compatible
N	1200	H	P, T	N	Digital voice synthesizer; voice verification
N	300, 1200	F, H	P, T	N	Help command from keyboard; clock on board; internal diagnostic capability
N	1200	F	P, T	N	None
N	1200	F, H	T	N	Multi-line controller
N	0-300	F, H	P, T	N	LED indicators; push-button test
N	1200	F	P, T	N	Memory battery protected
N	300, 1200	F	P, T	PC COM I	Stores up to 10 telephone numbers
N	300	F, H	P, T	N	Hayes-compatible
N	1200	F, H	P, T	Transpak PC Plus	Hayes-compatible; auto dial-tone sensor
N	110, 300, 1200	F	P, T	N	Security password
N	0-300	F	P, T	N	Line-powered
N	300, 1200	F, H	P, T	Crosstalk-16	Script processing fits into small-size slots
N	300, 1200	F, H	P, T	N	Internal speaker
N	300, 100	F, H	P, T	N	LED lights; internal speaker; detects speed of incoming calls
N	300, 1200	F	T	N	None
N	300, 1200	F, H	P, T	N	None
N	300, 1200	H	P, T	N	European protocol supported

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Should You Change Your Software?

Q. A lot has been written lately about integrated software packages. Should I give up my current software and switch to something integrated?

A. The only way you'll be able to make that decision, says Brad Roth, sales consultant at Infomax Computers in Walnut Creek, Calif., is to take a look at the integrated packages that interest you to see if they offer enough extra features to make such a change worth your while.

The first thing Roth says to do is decide what your needs are. Do you want to move data easily between applications (putting a portion of a spreadsheet into a text document, for example), or do you mainly want to move easily from one application to the next? Some integrated packages use the same data files for all applications, so you can transfer data between them easily, while others use different data types for their spreadsheets, word processors, and database management modules. Integrated packages with different data types among their applications will make it easier for you to switch between applications.

Are you looking for something significantly easier to use than what you have? If you use separate word processing and spreadsheet programs, for example, the chances are these packages use very different command sets. An integrated package is more likely to have similar command sets for all of its applications, which makes it easier to learn and use.

It will take some serious consideration on your part about whether what you have now is really meeting your needs or not, because changing over to an integrated program will require some more learning time that may not be counterbalanced by an increase in productivity.

Another software alternative that will be more in evidence this year is an "operating environment" like Microsoft Windows, DesQ, or VisiOn, which may allow you to take your existing software and link it together to make moving from one program to another much easier. This alternative is attractive because in most cases, the environment won't cost as much as a new integrated package, and it won't require you to relearn the applications themselves.

Q. I want to use a modem at the office, and I'm wondering what sort of problems I'll encounter when I use a line from our in-house PBX system.

A. According to Ren Breck, director of marketing at InfoMEDIA in San Bruno, Calif., most private office telephone systems require you to dial a number or numbers to get an outside line, so you'll have to add those numbers to the dialing sequence when you're calling out with your modem. If your communications software allows you to store log-on sequences for different computers or information services, you'll want to change the log-ons to include the additional numbers that your telephone system requires.

In some cases, your desk-top telephone will automatically give you an outside line, but your modem will have to dial from one to three numbers to get one, so if you hook up your modem and can't get a call through, this may be the problem. The best thing to do is check with your telephone system representative.

You will probably also want to insert a pause between the outside line code and the actual telephone number, as most systems ask you to dial the outside line code and then wait for another dial tone. By inserting a pause, you'll give the phone system enough time to produce the second dial tone.

If you want to *receive* data on your modem through your private phone system, you may have difficulty, because such systems are set up to direct calls to specific lines only through operator intervention. Your PBX operator probably won't know how to deal with the high-pitched whine of an incoming computer's call, and even if she does, you run the risk of having the call disconnected in the transfer process. Given these circumstances, if you want to receive data, it's best for you to call the other computer instead of trying to figure out how it can call you.

You could also arrange to get a direct outside line, which will completely bypass the in-house phone system and therefore not require you to dial any additional numbers to get out, or operator intervention to get in.

There is one other potential problem with in-house telephone systems

if you don't have a direct line; most of the systems have a call-waiting feature that lets you know when you have a second incoming call if you're on the phone. This is nice if you're talking to somebody else, but it's not so nice when your modem is trying to send or receive data on the line. If your modem is busy sending or receiving, the signal that another call is waiting will interrupt the data flow, perhaps even terminating the connection. If your system has this call-waiting feature, see if there's a way to turn it off on the line your modem is using to avoid any problem.

These are the two most common considerations in using a modem with an in-house phone system, but there could be others. Keep these remedies in mind when you first try hooking up. If your problems persist, talk to the technical representative of the business phone system supplier, and if necessary, get in touch with the manufacturer of the modem itself.

Q: I own a TRS-80 Model III, and would like to know if any company manufactures a green screen that could replace the monitor that's inside the TRS-80's body.

A: As a matter of fact, there are several companies that make replacement CRTs (cathode ray tubes) for personal computers. The largest outfit specializing in such replacement screens, Langley-St. Clair Instrumentation Systems, markets a line of green and amber CRTs called Soft View for a variety of machines, including Radio Shack's TRS-80 series. The cost of a replacement screen is usually in the $80 to $100 range.

One of the major reasons most people have for wanting to replace the black and white screen in the Model III, explains Donna Williamson of Langley-St. Clair, is the bothersome flickering often produced by the inability of the black and white CRT to "hold" the electronic image

on the screen for very long. This strobing effect can be a nuisance to someone who logs many hours in front of a personal computer, says Williamson.

"Certain people have a higher sensitivity to it (strobing) than others, and there are different reactions to it—a headache probably being one of the most common," she notes. "If you're working on your computer for an hour a day, nothing might ever bother you. But if you're working on your computer for eight hours a day, you're going to become more sensitive to minor irritants."

Replacement screens like the green and amber (among other colors) screens produced by Langley-St. Clair are designed to hold the image on the screen for a longer period of time and thereby reduce possible eye strain caused by a black and white screen. Williamson points out that there are a number of other benefits which may accompany a replacement CRT as well. Among some of the other available features are a chemically treated surface aimed at reducing glare, and lead-impregnated glass which almost completely eliminates X-ray type emissions created inside a CRT.

While there are a number of colors available in replacement CRTs, Williamson recommends the amber screen, noting that it is the standard in Europe largely due to findings that "the eye sensitivity peaks in the amber range." The amber characters will appear brighter and "seem to add to character definition," she says, even though the screen's resolution—which is set by the computer itself—will be identical with the replacement.

As for the actual procedure of replacing the CRT, you can do it yourself. It should take only about a half hour or so, according to Williamson, since there is no drilling or soldering involved with direct replacement screens. Instructions for installation are included, of course, and the procedure begins with keeping the com-

puter off for at least an hour (overnight to be really on the safe side) to allow any electrical current still residing in the machine to be discharged. Williamson cautions only that "you should be careful doing anything involving electricity."

If you don't want to take on the task of replacing the CRT, a computer service center should be able to do it for you at a slightly higher cost.

Q: I have an Apple III. By using an emulation disk I can run Apple II programs on it, but I can't run Apple III programs on an Apple II. If I have a modem, though, can I transmit a mail list file of names, addresses, and other fields from my Apple III to an Apple IIe, and then have the Apple IIe run the information on a printer?

A: Yes, says John Morand from the AppleSeed User's Group in Worchester, Mass. You can transmit a file from the III to the II by modem using standard communications software for each machine. However, he points out that it would take a long time to transfer a database file by modem.

There is another way, Morand says. If you format a disk using Apple's PRO-DOS operating system on the II, or Apple's SOS operating system on the III, data from that disk can be read on either the II or the III. So, after formatting a disk under PRO-DOS or SOS, you can put your data-base file on that disk running Mail List Manager on the Apple III, and read the file from that disk running similar software on the IIe.

When you're ready to save your data-base file on the III, tell the computer to print it to the disk. Do this by preparing to print out the data base. Then, when the computer asks for a printer destination, type in the name of a file that resides on the disk. If you try to assign a new file name, you'll get an error message.

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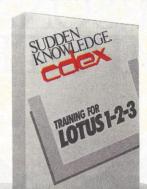
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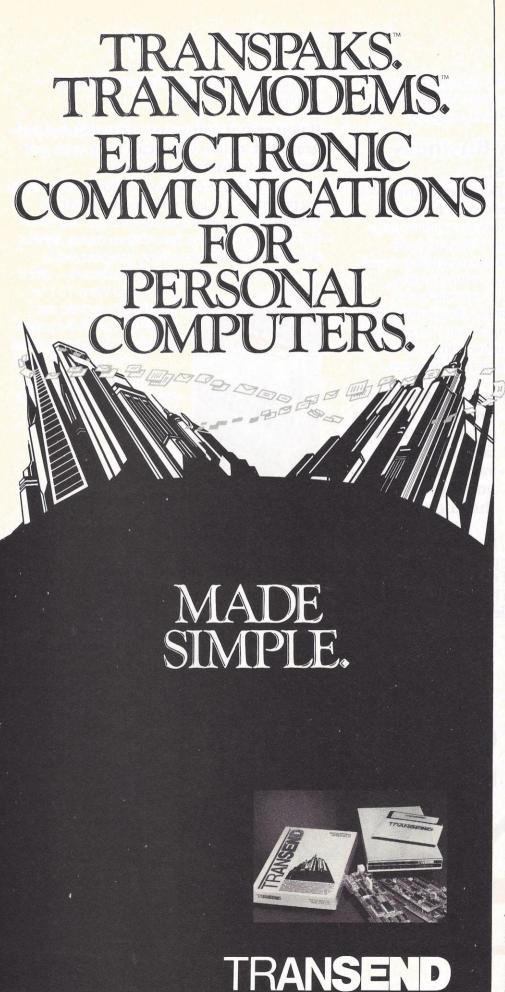
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(continued from page 140)

This procedure saves the file to the disk and converts the file into text form. Now you can take that data disk, insert it into your IIe, and print the file out using similar mailing list software, as long as it's compatible with the PRO-DOS operating system. If you don't have such software, Morand recommends that you write a simple BASIC program under PRO-DOS to print out text.

Q: I recently bought a Texas Instruments 99/4A. Since the model has now been discontinued, I want to know this: Will I be able to get service, software, and accessories for it once they are completely off the market?
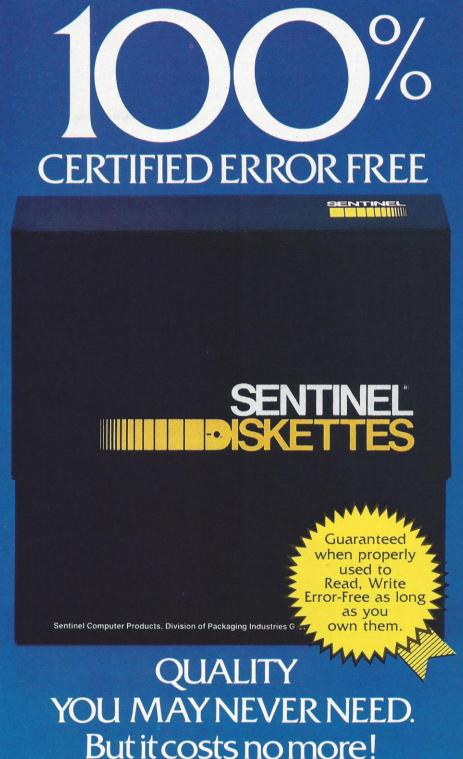
A: David Leonnig, a press relations representative for Texas Instruments, says that while TI will no longer develop and manufacture software and peripherals of their own for the 99/4A, owners will not be left out in the cold. Third-party developers and manufacturers, Leonnig says, will fill much of the gap in the market for TI.

"We are encouraging people to develop peripherals for the 99/4A," he notes. "We are also encouraging people to develop software, and we are either licensing the technology to make cartridge software or we are selling the GROM (graphic read only memory) chips so that people can use them to make their own software."

Leonnig also points out that service warranties will be unaffected by TI's withdrawal from the home-computer market. The regular service warranties—one year on the computer console itself and 90 days on peripherals or software made by TI—will be honored by the company, he says, regardless of when you purchased your computer.

There is one more piece of reassuring news from TI: Communications lines will remain open in a number of

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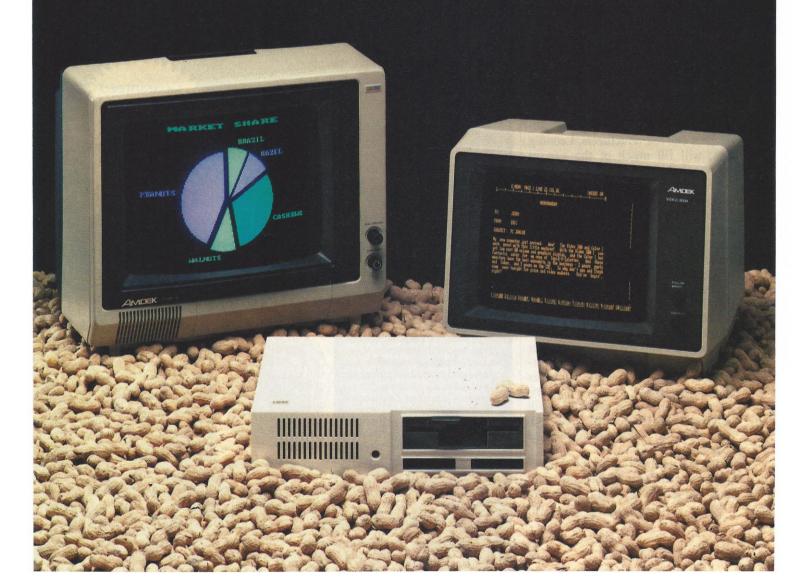
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CIRCLE 167

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SAFEWARE was developed by an insurance professional who was shocked to learn that his very own personal computer was at risk. Can you imagine? What he discovered was that his homeowners insurance policy excluded coverage as soon as he began operating his first business program. Even his simplest spreadsheet voided coverage. Because most homeowners policies *won't cover any equipment used for business*, no matter how infrequently. Out of this need was born SAFEWARE. A simple, easy-to-understand coverage you can count on. Full replacement coverage of hardware, software and media, after a low $50 deductible.

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tant to you if you're ever planning to buy additional equipment or software. Even just one peripheral.

What the editors are saying

Desktop Computing: . . . "Given the amount of money that business users spend on computer equipment . . . it's not too farfetched to say that an insurance policy may be the most important new accessory that you could add to your desktop computer system."

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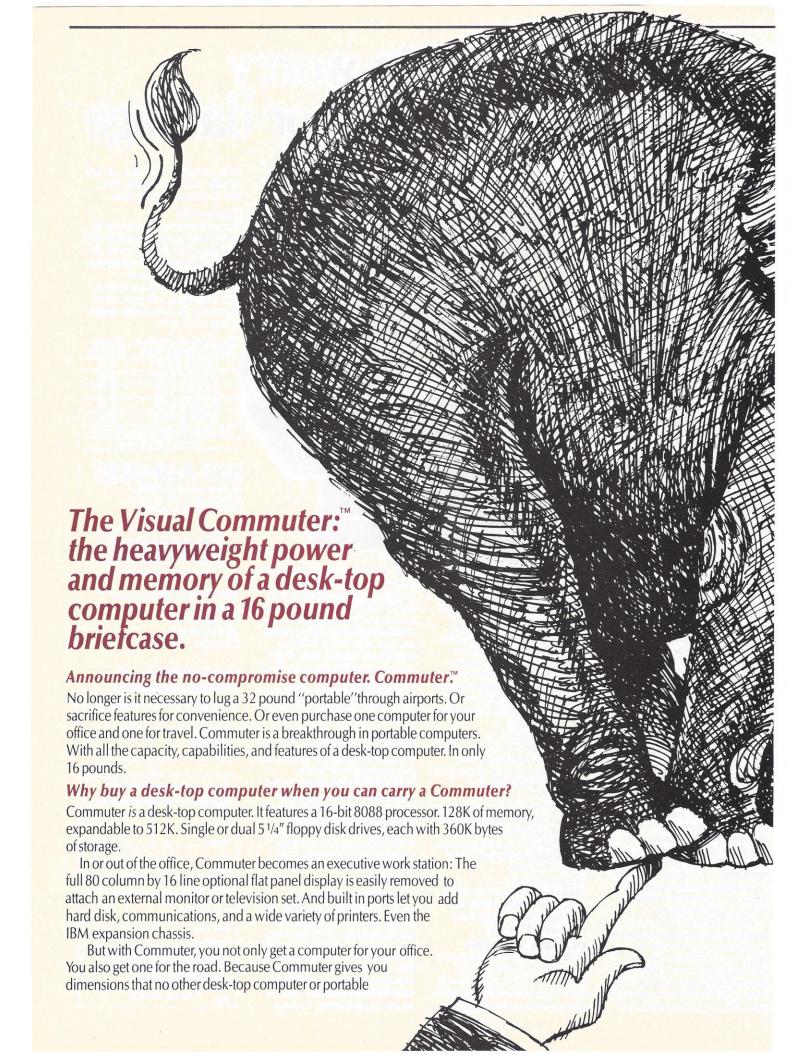
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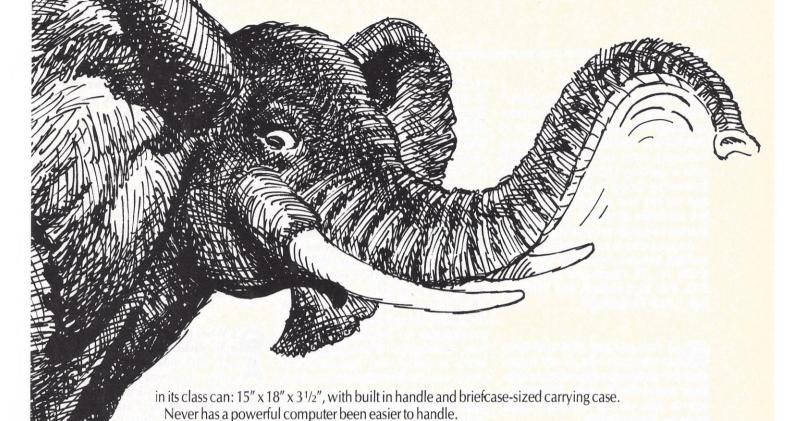
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ways. "The outlook is pretty good," Leonnig affirms. "TI is going to communicate with all the known users of the 99/4A. Anyone who sends in a warranty card on the 99/4A goes onto a mailing list. We are going to be sending things to that mailing list, and we are also going to make that list available to people who want to market things directly to consumers."

Anyone who is not currently on the mailing list and would like to be can write to: TI Consumer Relations, P.O. Box 53, Lubbock, TX 79408 or call 1-800-TI-CARES.

Q: I own an Atari 800, and those in my home who do not appreciate my early-morning computer sessions would like to know if there's a way to turn off the key-click sound made by the keyboard.

A: The folks at Atari say no, there isn't any way—unless you're willing to do some hardware modification (although Atari does not recommend you try to do it yourself). In other words, you can't just program or otherwise instruct the computer to eliminate the clicking sound made when you strike a key. Turning down the volume on the monitor or television set won't help either, since the sounds generated come from an internal speaker.

Q: I've noticed that when my printer is on, it takes a measurable effort to turn the platen manually to position the print paper. When the current is turned off at the printer, the platen turns very smoothly. Why is this?

A: In all likelihood, the printer platen takes more of an effort to turn when the printer is on because the motor is engaged even though the platen is not moving and you're not printing anything out. This "holding current," says Marvin Hunt of C. Itoh Electronics, will keep the printer

motor engaged as long as the printer is turned on and may cause the friction or resistence you're experiencing. Many printers, such as the ones made by C. Itoh, use a system where the current is turned on and off as needed, thus eliminating this problem.

Q: I'm thinking of changing my word-processing program, but I like my spelling checker. Will I be able to use it with a new word-processing program?

A: There are two criteria to look for, according to Ron Lichty, a programmer at Softwest in Sunnyvale, California. First, you should check to see if your old word processor creates files that can be edited with the new word processor. If it does, then your spelling checker will probably work with the new program.

The other common denominator found in many spelling programs that work with more than one word processor is that they check standard DOS text files. If your spelling checker works with this type of file, make sure your new word processor creates the same kind of file.

If you have a specific word processor in mind, you can check out the compatibility in advance by seeing if there's a configuration option for that program in your spelling checker.

The best way to be absolutely sure that you can continue using your existing spelling program is to take it with you when you shop for the new word processor. That way, you can check a file right in the store.

Q: Can the use of 100 volt/50Hz power adversely affect my Apple IIe, the disk drives, and/or my Prowriter printer?

A: John Morand, from the AppleSeed User's Group in Worcester, Mass. says yes, because continuous low voltage will cause the power supply of the computer to heat

up to compensate for the power difference. If the unit overheats, it could cause irreparable damage to the system.

Morand says you need a step-up transformer in order to properly compensate for the low voltage. Since the Apple IIe is not frequency dependent and since the disk drives are powered from the computer, a step-up transformer will allow your IIe and disk drives to operate safely. Morand adds that other system components must have a UL approval stamp in order to be safely operated this way.

Q: What is the advantage of using $3\frac{1}{2}''$ disks in computers?

A: As with most electronics products, improved technology has driven the trend in disk drives toward smaller size, and there are many advantages to the $3\frac{1}{2}''$ disk format over the older $5\frac{1}{4}''$ and $8''$ formats, according to Barry Noebel, sales representative at ComputerLand in Newport Beach, California.

First of all, the smaller size means less storage space is necessary for the diskettes themselves. In fact, the $3\frac{1}{2}''$ diskettes are small enough to fit in a shirt pocket or purse. The new diskettes are also packaged differently; instead of a thin protective sleeve, they have a hard plastic housing that makes them more resistant to damage from scratches. There's also a sliding metal piece that covers the magnetic media. The metal cover automatically slides out of the way when you load the diskette in the drive and closes again when you remove it, making it much more difficult to damage the diskette.

Another advantage is an improved write-protect mechanism. The hard-cased diskettes have a sliding plastic tab that can be moved back and forth to write-protect the disk, instead of the old stick-on tabs used with larger diskettes.

When it comes to the disk drives

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Boilerplate texts and Keyphrases: You can store commonly used phrases and paragraphs to insert into your text with a single keystroke.
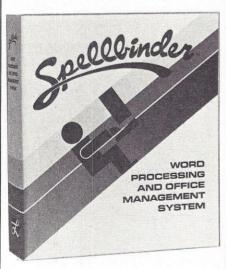
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(continued from page 150)

themselves, smaller size means that manufacturers can make their computers smaller, so they take up less desk space. In fact, many of the new portable computers are taking advantage of the smaller drives to reduce weight and bulk. The access time (the time it takes the disk drive head to locate and retrieve data from the diskette) is also shorter, because the head has to travel only about half as far with the small diskettes.

Q: Please clarify the confusion—is Apple's Lisa a 32-bit or 16-bit machine?

A: According to John Morand of the AppleSeed User's Group in Worchester, Mass., Lisa's 68000 processor qualifies the machine as a 32-bit machine.

The reason for the confusion is that the Lisa has a 32-bit internal address capability, but a 16-bit data path.

As Morand explains, the Lisa can process data in its CPU in 32-bit chunks. This makes it very fast at processing data—computations, sorting, and other processing tasks.

However, data going into or out of the CPU travels in 16-bit chunks. That is, data going to or from your disk drives, to your printer, or to or from another computer will travel 16-bits at a time, half the amount of data processed inside the CPU.

Q: How can I use my Hayes Micromodem II in conjunction with long-distance phone services such as MCI and Sprint? Also, how can I upgrade my modem from 300 to 1200 baud?

A: The answer to both questions —given the equipment you have—is: You can't. A quick check with the technical support team at Hayes reveals that the Micromodem II is the one model which will not accept signals generated by an electronic touch-tone telephone. It ac-

cepts only rotary-dial-generated signals which means, since long-distance services like MCI and Sprint require touch-tone phones, you will not be able to use the Micromodem II with these services. There is some good news, though, and that is you'll be able to use MCI or Sprint with any of the other Hayes modems (including the Micromodem IIe), because they all accept either rotary or touch-tone signals. Also, services like MCI and Sprint may soon be able to work with rotary-dial phones; if that happens, your Micromodem II should work just fine.

As for upgrading your modem from 300 baud to 1200 baud, the folks at Hayes say forget it. The only way to increase the baud, and thereby increase the speed of your transmissions, is to buy a 1200-baud modem. Sorry about that.

Q: I recently purchased an Apple IIe with an Apple Disk II drive. The disk drive rattles violently, especially when initializing a new disk. I haven't experienced any other problems, but is this normal?

A: That depends on how "violently" the drive is rattling, according to Mike Wedral of Computer Universe in Paramus, New Jersey. If the drive is shaking and making excessive noise (and it's hard to say just what constitutes excessive with little or no previous experience), Wedral suggests you have it checked out by an authorized dealer. It may just be that the drive needs some tightening up here and there and a good cleaning.

A loud, rattling noise coming from the disk drive is common, however, when initializing a new disk. More often than not, the cause of the noise is simply the result of the initializing process. In basic terms, it works like this: After loading the disk operating system from either an already initialized disk or a master DOS disk, a new disk is inserted into the drive to have

this operating system put on it as well. When the initializing code is keyed in, the drive will erase everything on the disk (no problem with a new disk) and go to "track" 0 where the operating system will be stored. The read/write head of the drive moves along these tracks, somewhat analogous to grooves on a record, to store data on the disk. Single-density disks have about 35-40 tracks, while double-density have about twice that many.

The process the drive goes through to erase any data on the disk and go to track 0 is usually a noisy one, with the noise level depending on how much needs to be erased and how far away from track 0 the drive head happens to be. If the head is on track 1, for example, then it won't have very far to go. The drive will spin the disk for a certain length of time nonetheless, and the resulting overkill will produce that rattling sound. Provided that everything's working fine once you complete the process, there's probably no reason to be concerned.

Q: I've been hearing a lot about concurrent processing. What's the big deal?

A: Barry Noebel, sales representative at ComputerLand in Newport Beach, Calif., says that concurrent processing is a relatively new concept that in basic terms, simply means that your computer is doing more than one thing at a time. Noebel also says it will take some getting used to before people realize its advantages.

The most recognizable type of concurrent processing (and the most likely use of this capability) is printing one document while you're working on something else. You can get this kind of concurrent processing now by installing a printer buffer on your computer. This is an extension of your main memory that stores the

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file you want printed and feeds it to your printer, freeing your main memory to work on something else.

As concurrent processing becomes a feature of new operating systems, you'll be able to recalculate a spreadsheet while editing a text file, or draw a graph while performing a lengthy sort through a data-base program.

Q: We are planning to buy a number of computers for our high school, but before we decide on which model to buy, we'd like to find out what educational software is available for which machines. Is there some kind of reference manual for educational software?

A: Yes. One such manual is Software Reports from Allenbach Industries, Inc. It reviews educational programs for Apple, Atari, Commodore, IBM and TRS-80.
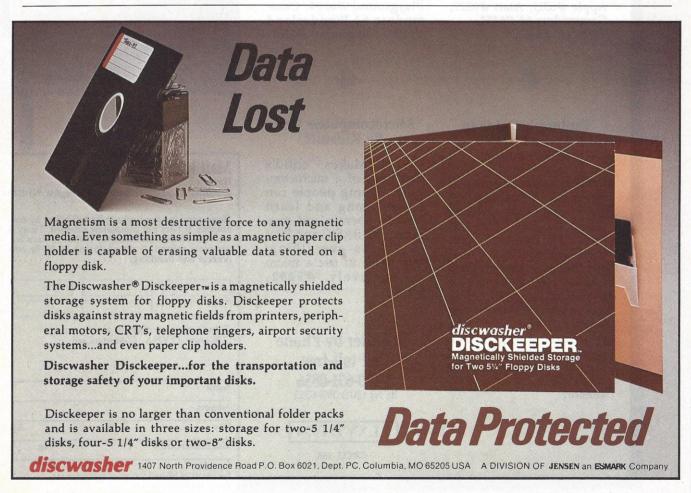
The first edition evaluated 382 educational programs in 20 subject areas. Every grade level is covered, from preschool through adult, and software for administrators is also included. According to Allenbach Industries, reviews are coordinated by an independent software review board, The Evaluation Committee, which rates software on a structured point scale for consistency in evaluation. The reviews include a summary of the product's features, a brief description of the program, and a graded evaluation.
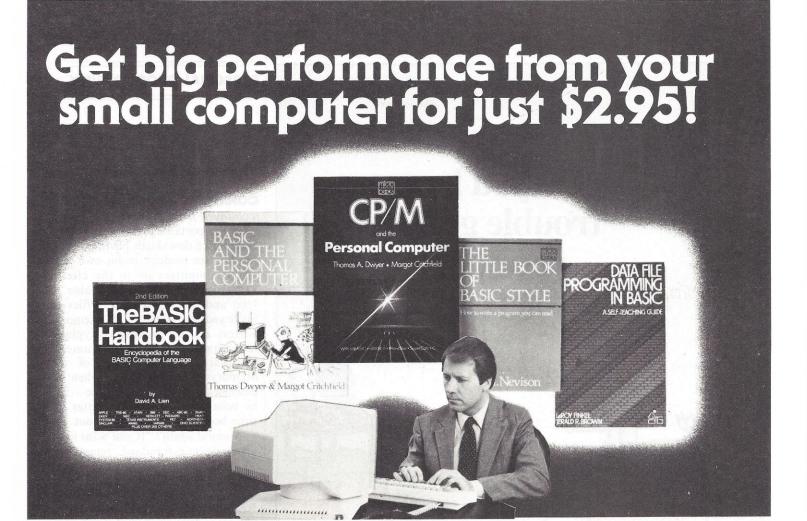
Publisher Phillip H. Kessler says, "The manual was designed for educators and home-owners who need brief, current, and objective evaluations of the hundreds of educational software programs available."

Software Reports will be sold nationwide in computer and book stores, or by mail order from Allenbach. It's priced at $59.95, and you can contact Allenbach at 2101 Las Palmas Dr., Carlsbad, CA 92008; (619) 438-2258.

CORRECTION

In our January 1984 issue, we listed the price for the Dow Jones Market Analyzer as $395 (page 151). The correct price is $349.

CONNECTING HOME/OFFICE

with the portable." After he writes, Heidenrich downloads his files, using the built-in modem, to his own personal computers or to the client. From home, he's even been able to send and receive WordStar files to his brand new Xerox 625C Memorywriter, a word-processing/typing/letter-quality printing instrument. Not that all of the features of the Memorywriter work yet when he downloads from the Osborne—but he believes it's only a matter of time before he figures them out.

A moral again? "If you want to do anything non-standard, remember: 'A standard is a standard, but it's not standard,'" Heidenrich says. Just as manufacturers specify different RS-232 "pin-outs"—ways of disabling certain wires and connecting others to get their equipment to "handshake" with another computer, and to know when each side is ready to send and receive, so do they also aim their documents and schematics for the non-variable case. These constitute roughly 95 percent of the cases, in Heidenrich's view. "The technical direction should be available," he says, for the exceptional case. "It's just not routinely available." How does he get around it? Heidenrich stores and catalogues massive amounts of printed material, including diagrams, to help him piece together a solution. He also talks a lot on the phone. Is he more productive doing it, this harder way? "Not in the interim, but in the long run, yes," he says, "I am more productive."

That's the bottom line, after all. "To be more productive, you have to multiply your effectiveness," Heidenrich concludes. Connecting your computer to the office can help. It doesn't matter if the connection is plain or fancy: just get it going. You may have to work harder—but you'll also have the chance to be your own boss. As Heidenrich and millions of others affirm: That ain't all bad. 🔟

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MICRO/MAINFRAME

relatively easy to juggle man-hours or reduce everyone's budget by 10 percent."

One way to simplify the transition to micro-mainframe communications is to make sure everybody's reading from the same script. Undoubtedly, future corporate purchases of personal computers will favor compatibility—both in software and hardware. That means the DP division will encourage everybody to buy the same hardware and software. For those within the corporation who already own maverick systems, it will be necessary to set up communication networks that allow different computers to share files and peripherals as well as providing access to the central data base. Users who are hoping to replace their terminals with personal computers will probably experience the strongest pressure to conform to DP's standards. Both Ferris and Garcia doubt that the MIS departments will be that strict on standardization. "Many large corporations are standardizing on the IBM Personal Computer," says Ferris. But he adds that most companies do not decree that "thou shalt only buy an IBM Personal Computer." Ferris explains: "It's not practical in most companies to do so. If a person decides he wants a Lisa, he can get it by in the budget somehow." Garcia also believes personal computer users are unlikely to accept a standard. "My opinion about microcomputers is that you'll never get a large company to be successful at complete brand-name standardization. Computers are like cars. I like an Oldsmobile and you like a Chevy; they're both made by GM, but there are features about one that appeal to my personality," she insists.

Ferris stresses, however, that DP can use other methods to get people to go along with the move to compatibility—without having to enforce a particular standard. One of these methods may be to restrict training and support to employees using the system supported by DP. If you buy an outside system, chances are you'll have to train yourself or seek training from an outside consultant. Departments which don't conform may have to train someone to be the resident expert, thereby retaining freedom of choice and insuring continued independence from the DP division. But there will always be those who resist following the pack, says Garcia. "There are people who don't want information services in their business. 'You stay out of my business and I'll stay out of yours . . . let me do what I want and I'll get my job done,'" is typically how these independents think, according to Garcia.

It is virtually assured that over the next few years, there will be a steady increase in corporations linking microcomputers to their host systems. As software developers provide practical, easy-to-use solutions to the problems we've identified, and MIS divisions become proficient at installing and training users to take advantage of the resources stored in the central computer, micro-mainframe communications should become commonplace. When users like those described in our beginning scenario can get into the corporate data base and find the information they need quickly and efficiently, the benefits will outweigh inconvenience.

But in the meantime, there's a lot of debugging to be done before most of us will be rummaging around in the corporate files. The sacrifices required will make the move to link with the mainframe unappealing to fierce independents who bought their computers to increase productivity and get out from under DP's thumb, while other users will never have a need to access the corporate data base, preferring to wait for the occasional printout from DP. And for still others, personal computing will remain just that—a highly individualized approach to business. 🖽

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TAX AUDIT
(continued from page 105)
create *new* difficulties. Larry Wright explains that "Some types of computer programs are very risky—specifically, those that make judgements about whether a particular expense can be used as a deduction." No software program can provide the advice of an experienced tax professional. And if you do make an error on your return, you can't use the computer as an excuse, adds Wright.

Personal computers are also limited as far as preparing complicated returns. In some cases, an accountant is still your best bet. Simon Pearlman hesitates to give computers a clean bill of health, because he is concerned that someone may think a computer and a good tax program are sufficient substitutes for a tax professional. It's that lack of professional judgement that may cause problems, he warns.

"For instance, I had a client who was very knowledgeable about computers. He used his computer to generate a tax number that did not include the alternative minimum tax. He brought his figures into the office and we discovered that because of this error, he would have paid $8000 more in taxes than he anticipated," Pearlman explains.

But in spite of its limitations, your computer can do a lot to take the anxiety out of tax time. Just remember that audit survival doesn't begin when you get the IRS notice in the mail. It's an on-going process, with organization and vigorous record keeping as the key and your personal computer the integral tool. Keeping "Big Brother" at bay and insuring you don't pay any more into the government coffers than you have to is not easy. If your computer can help, it's one more way to justify the investment. And remember, using your computer for tax preparation may even entitle you to write it off. But keep the receipt handy—you never know when you may need it. ⓵

Smartcom II communications software.

NOTE: Smartmodem 1200B may also be installed in the IBM Personal Computer XT or the Expansion Unit.
In those units, another board installed in the slot to the immediate right of the Smartmodem 1200B may not clear the modem; also, the brackets may not fit properly. If this occurs, the slot to the right of the modem should be left empty.

And, in addition to the IBM PC, Smartcom II is also available for the DEC Rainbow™ 100, Xerox 820-II,™ and Kaypro II™ personal computers.

Backed by the experience and reputation of Hayes. A solid leader in the microcomputer industry, Hayes provides excellent documentation for all products. A limited two-year warranty on all hardware. And full support from us to your dealer.

So see him today. Break out of isolation. Get a telephone for your personal computer. From Hayes.

Hayes Microcomputer Products, Inc., 5923 Peachtree Industrial Blvd., Norcross, GA 30092. 404/441-1617.

GAMES THAT TEACH

did wrong. The customer will feel more relaxed and safe because you have acknowledged defeat. He may tell you what went wrong as well as previously unstated objections. Use this information and his stated objections to close the sale."

Raising your average

"The program is a learning experience for me because it helps to focus my attention on myself and my client," says Van D. Olmstead, Jr., account executive with Alex Brown & Sons in Wilmington, Del. "It teaches you the tools that are available for you to achieve your objectives and pinpoints the needs of the client in an extremely ethical way. It's almost criminal not to use it."

Olmstead works in a small branch office of the investment firm and took the initiative to try The Sales Edge on his own. If his pilot program proves successful, The Sales Edge may be used on IBM Personal Computers at branch offices throughout the firm.

"I think of The Sales Edge as a translator," he explains. "We all have different personality traits and sometimes when we attempt to convey a message, it can become totally lost on another person. This program enlightens your sensitivity to the buyer's needs and that is paramount in sales."

Olmstead discovered this package's effectiveness within the first week of use by applying it to specific problems. First he ran a customer profile for a client with whom he had a tremendous rapport. "Before, this particular client would take my advice about 80 percent of the time. That instantly increased to 95 percent."

In another instance, he ran a profile of a customer who had taken his advice only once in the past four years. The Sales Edge told him he was a broad-brush type person while his client was extremely detail orient-

ed. He adopted a more detailed approach and made a sale on his first try.

Thoughtware and Human Edge are two of the first software companies to wed psychology and the personal computer and direct the result toward the business executive. Johnson has applied for patents to protect his process, and already he is planning a whole line of software that he calls "life strategy" programs. "Essentially, this software will help people do everything from buying a car to planning life goals," he explains. "It will be aimed at fast-track, success-oriented individuals."
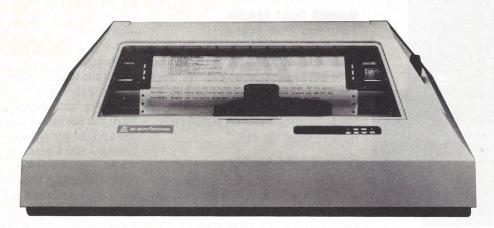
And Thoughtware's Levine has similar ideas. He plans to expand his line of management training software to include 26 packages aimed at specific problems faced by business managers. But Thoughtware has already branched into personal development software. It is marketing a Managing for Success series of software from CBS Software for the Apple II series, the IBM Personal Computer and the IBM PCjr.

This trend signals possibilities for learning how to operate successfully in the business world that go beyond numbers or what can be learned in a Harvard MBA program. Anyone with a personal computer and a desire to improve his or her business skills can do so for the price of a software package. You learn to succeed by discerning the best course of action in a specific situation. Until recently, the psychology of how personalities interact had no champions in the business software market.

When it comes down to it, software that teaches sound management is really a marriage between psychology and the personal computer. It's all fairly elementary psychology. But the breakthrough comes when you can have this information on the job and available to you in minutes. Your computer, in effect, becomes a staff psychologist who's at your bidding 24 hours a day. 🖬

COMMUNICATIONS HARDWARE
(continued from page 128)
code and long distance area code. . . . Everytime you break the ice through to another system, you get a dial tone from that system. The modem has to recognize that and then go further when the dial tone is there."

Another point that Sorkis considers important is "DTMF (dual tone multiple frequency), commonly called touch tone and pulse dialing like the old-fashioned phones. Our modems can change between pulse and tone. Let's say that I'm on a modern-day PBX and I need to dial a touch-tone 9 to get an outside line. So I dial 9. But if the local phone system for the MCI number has pulse dialing, I must pulse dial that. Then I break back into the touch-tone mode to enter in my account code and my long distance area code and phone number. So the ability to change between tone and pulse within the same number is important."

The future: faster and better
Choosing a modem will likely become even more difficult in the near future, because 2400- and 4800-baud modems will be widely available. Stitt says, "There's a specification for a 2400 bps, full-duplex modem in the CCITT scheme of things. It's called a V.22(BIS). Those are starting to appear in this country, and are selling for essentially double or more the price of a 1200-baud modem. I think they'll become more popular as telephone calls becomes more expensive."

Ferguson agrees, but with the proviso that 2400-baud modems won't really become popular until "services like The Source and CompuServe are compatible with them. Until then, I think 1200-baud is the standard in speed."

Many people argue, though, that 2400-baud, full-duplex transmissions are not possible on standard phone lines, or rather that they're possible but horribly unreliable due to background noise on the line. Stitt says, "That's a misconception. The same misconception prevailed when 1200-baud modems first came on the market. There are still people who will swear to you that 1200 bps is impossible."

The same holds true for even faster speeds, Stitt says. "I think you will see 4800 and 9600 bps, dial-up full-duplex modems. It isn't going to be next year, but it is going to happen." He adds that, "One manufacturer has what they claim is a working 4800 bps full-duplex modem, but unless they can get the CCITT group to adopt their standard, it's simply a matter of time before their modem goes away."

Kessler disagrees with Stitt's final point, saying that internationally endorsed or industry-endorsed standards will be less important for 4800- and 9600-baud modems because they will probably be used mostly by companies setting up their own communications networks, as opposed to by people who want to dial up The Source. However, he does agree that the CCITT-endorsed V.22(BIS) will be the standard for 2400-baud modems.

Whatever choice you make in buying a modem, you can be assured that your modem will become more and more useful every day. As Ferguson says, "Communications for personal computer users are probably growing faster than any other segment of the market right now. The reason why it's growing so fast is because the more personal computers out there and the more information services, the more computers there are to communicate with and the more reasons why a computer needs to communicate. . . . If someone invests $5000 or $4000 or even $2500 on a personal computer and does not have communications, he just is not going to achieve his full potential because communications is an important part of the productivity gained with a personal computer."

What's Hot And What's Not

■ Computer Fear ■ Computer In The Classroom
■ Computer-Assisted Instruction ■ IBM PC Connection
■ The Naked Computer

Confronting Technophobia

OVERCOMING COMPUTER FEAR
JEFF BERNER
SYBEX, INC.
BERKELEY, CA
92 pp., $3.95

It comes as something of a surprise that the neologism *technophobia* is nowhere to be found in *Overcoming Computer Fear*. That, however, is a small complaint about an otherwise excellent book.

"Technophobia," as the word suggests, means "fear of technology," but it has come to be used almost exclusively in regard to computers. Nevertheless, Jeff Berner prefers "jerkophobia," which means fear of looking like a jerk (although it could mean a fear of jerks).

Fear of looking foolish is only one source of technophobia. Others include loss of prestige when performing, quickly and simply on the computer, tedious tasks previously left to clerks and secretaries; fear of wasting money on a machine that the would-be user cannot master; and fear of actually breaking the computer. Perhaps the most deep-seated fear of all is the feeling that the machines will eventually replace people, and that every potential user, from the stockroom clerk to the department head, is expendable.

Berner goes a long way toward dispelling these fears. Although his book is small, it's packed with useful information and suggestions.

What makes the book especially valuable for technophobes is its near-conversational style, which immediately serves to make the reader—who is likely to approach the book with some trepidation—feel at ease and at home.

The book begins with a discussion of the fear of learning ("jerkophobia"), follows with a section that deals with distaste for technology in general, and neatly segues into the fear of computers specifically. The book also includes a section called "Women and Computer Fear," in which the author discusses, in his no-nonsense style, the problems women face in the wonderful world of computers. There is little that is new here, but it serves as a neat and direct wrap-up of conditions that now prevail, and gives some sound advice about how women can be successful in the computer field.

After defining the sources of technophobia, the author provides the reader with various methods of combatting those fears. His recurrent theme and basic premise is that personal computers offer the user greater personal power, professional mobility, and greater income.

Without straining himself, Berner encourages the reader to see the value of reversing fear. For example, in the first part of the book dealing with sources of technophobia, he leads off with "The Fear of Learning and Jerk-ophobia." But the first entry in the section on overcoming technophobia is called "The Joy of Learning."

The book is replete with anecdotes, including many from the author's own experiences. To those who already have some experience with personal computers, *Overcoming Computer Fear* will serve as little more than a review. But for friends, relatives, employees, and middle-management executives who still harbor trepidations about computers, this book should be required reading.
—*Marvin Grosswirth*

Readin' And Writin' And RAM And ROM

USING A MICROCOMPUTER IN THE CLASSROOM
GARY G. BITTER,
RUTH A. CAMUSE
RESTON PUBLISHING CO., INC.
RESTON, VA
339 pp., $15.95

Anyone picking up a book with this title has a right to expect the worst—an unhealthy dose of "computerese," heavily seasoned with "educationese." (These two jargons have done more to violate the English language than any other, with the possible exception of "sociologese.") Happily, the authors have managed to keep both jargons down to a minimum. "K-3" (i.e.,

"kindergarten through third grade") is about as bad as the educationese gets. (Whether the word "criteria" appearing as a singular noun is jargon or a lapse on the part of the authors, I cannot tell.) The computer talk is intended for a layperson who has no familiarity with computers, an intention that, in general, succeeds.

The authors begin at square one: The first chapter is titled "Getting to Know Your Microcomputer." The book also covers a bit of history, the uses and abuses of computers in contemporary society, and an overview of computer literacy. If these paths seem well-worn, bear in mind the readership for whom this book was written. In any case, even if one is familiar with these subjects, the book begins to earn its price when it gets into what its title promises. There is a gold mine of information here. Computer-assisted instruction (CAI) and the kind of software and hardware best suited for classroom use are well covered. But by far the best this book has to offer is for the nitty-gritty, down-to-earth, everyday life in the classroom. Among the goodies is a complete "Computer Literacy Curriculum" for grades K-12. Most teachers should be able to use the curriculum, either straight out of the book, or as a model against which to construct a curriculum for a specific situation. The section titled "The Microcomputer Classroom" neatly ties it all together.

The book also includes no less than 12 helpful appendices of the sort one might expect: resources, publications, bibliography, manufacturers and vendors, etc. Two of these cover "Teaching BASIC Programming" and "BASIC in Ten Easy Steps," which alone might induce a teacher to buy the book.

Using a Microcomputer in the Classroom is an eminently thorough, highly readable book which should be read by every educator on the brink of bringing the computer age into the classroom.

A few copies for recalcitrant school board members might not hurt, either.

—*Marvin Grosswirth*

Teachers' Little Helpers

COMPUTER-ASSISTED INSTRUCTION: ITS USE IN THE CLASSROOM
JACK A. CHAMBERS,
JERRY W. SPRECHER
PRENTICE-HALL, INC.
ENGLEWOOD CLIFFS, NJ
232 pp., $12.95

A personal computer as a teaching assistant is better than a human being because the computer never (fill in whichever of the following applies): gets stuck in traffic, gets an upset stomach, loses its patience with a slow student, demands higher wages, or goes on strike.

But the equanimity for which the personal computer is lauded also represents its major disadvantage. It displays not a shred of the human interaction so vital to the growth and development of a pupil. Obviously, then, a dedicated and conscientious educator will use the computer to enhance instruction and eliminate some of the drudgery of learning, but without sacrificing the human element. With that in mind, *Computer-Assisted Instruction: Its Use in the Classroom* provides a very useful handbook for the professional educator.

The authors are eminently qualified to undertake the task of acquainting novices with computer-assisted instruction (CAI). Chambers and Sprecher are, respectively, director and co-director of the Coordination Center for Computer-Assisted Instruction for the 19 campuses of California State University, and both have a number of other educational, academic, and commercial credits.

They have wisely divided their book into four parts. The first section is a general introduction to CAI, and includes a brief history of the field. The second section describes the methods for applying CAI in various classroom settings. The third part thoroughly covers "courseware" (an interesting neologism whose components obviously consist of "course material" and "software"; it is one of the few new jargon words that I rather like). In the final section, the authors allow themselves the liberty of predicting the development of CAI over the next few years. There is little that is new or startling here. Everything in computerland will get smaller, faster, and cheaper, including the facilities available for CAI, say the authors.

Recognizing the likelihood that some readers will probably be familiar with some of the material, the authors cordially invite them "to consult only those sections that address their particular needs." Of special value to educators are the sections dealing with courseware. Both the acquisition of existing courseware (and there is a mountain of material available) and the design of courseware for specific needs are thoroughly discussed. Appendices provide a conceptual design form and a detailed design form for CAI courseware that the reader may want to develop.

It should be noted that CAI is not the same as computer literacy. CAI is intended to help pupils with French, geometry, grammar, geography, and, yes, computer literacy as well.

There is only one thing missing from this and, apparently, from other works dealing with computers in the schools: As computers become smaller, faster, and cheaper, they are likely to be more ubiquitous in classrooms. When they do, it may be advisable for someone to write a book about how to keep school computers from being stolen or vandalized.

—*Marvin Grosswirth*

An On-Line Link With The World

THE IBM PC CONNECTION: TELECOMMUNICATIONS FOR THE HOME AND OFFICE
NEIL L. SHAPIRO
MICRO TEXT/MCGRAW-HILL
NEW YORK, NY
192 pp., $16.95

Neil Shapiro is widely known and respected in the computer community as electronics editor of *Popular Mechanics* magazine. He is also well known among that rapidly growing group of people who use personal computers to communicate via the telephone, because he serves as president and system operator of the CompuServe Apple Users' Group, an organization with several thousand members who meet electronically on the CompuServe Information Service.

Armed with these credentials, Shapiro has written *The IBM PC Connection,* a companion volume to his previous book, *The Small Computer Connection*. The earlier volume is, for Apple computer users, what the present volume is for IBM Personal Computer users. Although most of the information in the IBM book could be used with a variety of personal computers, there is special emphasis on a very specific (and popular) configuration for the IBM machine: the Hayes Smartmodem and the new and powerful ASCII Express-86—The Professional communications software package.

Shapiro has compiled a complete manual on using the Personal Computer for communication with other computer users. He discusses bulletin boards and information services on which people with similar computers, or similar interests, swap information and public domain software, get information from news wire services,

look up stock market news and prices, do their shopping and banking, chat with or leave messages for other users, and send electronic mail.

Shapiro gives a good introduction to getting started on the largest and most well-known information networks (the Source, CompuServe, and the Dow Jones News/Retrieval Service), and provides comparison charts, lists of services, sample menus, and lists of commands that will help network users find their way around more easily. At times this book seems more complete and more concise than the gigantic Source and CompuServe manuals. But, more importantly, the author includes the only complete guide to the use of smaller, more informal networks of independently operated computer telecommunications systems—the so-called bulletin boards, remote programs, and message systems that exist all over the country.

One of the great things about this book is that it tells how you can get started immediately. If you have the system the book describes, it tells you exactly how to set it up and get it running. It even shows how to set the switches on the Smartmodem.

An appendix (in actuality, nearly half the book) lists hundreds of privately operated bulletin boards and public message systems across the country, both by name and area code. It includes complete listings of the commands to use, what they do, and examples of how several of the most popular kinds of bulletin boards—including RCPM, Net-Works, IBM Hostcomm, Forum-80, ABBS, CBBS, and PMS—will respond when you make a connection. With this guide and Shapiro's clear explanations, there's no need to worry when you go on-line with one of the bulletin boards and are greeted with, "Command?"

Telecommunications is exciting stuff—the wave of the future. As Shapiro says, "I hope that by explain-

ing such things as bulletins boards and remote programs, I will encourage people to begin setting up what Alvin Toffler has called Third Wave cottages and what other people refer to as decentralized offices." The time is now.
—*Orlan Cannon*

Computer Trivia Unlimited

THE NAKED COMPUTER
JACK B. ROCHESTER
AND JOHN GANTZ
WILLIAM MORROW &
COMPANY, INC.
NEW YORK, NY
335 pp., $15.95

Have you ever wondered what Steven Jobs (chairman of Apple Computer) or David Packard (co-founder of Hewlett-Packard) is really worth? What the 10 largest computer crimes in the U.S. were? How accurate the computers in the Pentagon—with their electronic finger on the button—are? Where the words "byte" and "bug" come from? How many computer languages there are?

Jack Rochester and John Gantz have collected the answers to these questions, along with hundreds of other little-known facts and figures, anecdotes from the history of computers, and other computer memorabilia. All the first, last, fastest, slowest, biggest, smallest, most outrageous, and least-known computers and computer uses are here in what could have been called *Book of Lists of the Computer World*.

The book is divided into 20 chapters, each of which covers a specific area of computer lore: People and Companies, Computer Kids, Software, Military Computers, Medical Computers, Banking Computers, Computer Crime, Robots (remember

Isaac Asimov's three rules of robotics?), and famous Computer Failures.

This is the place to find the richest computer entrepreneur (David Packard, $1 billion); the fastest computer printer (45,000 lines a minute, used for printing junk mail, of course); the most reclusive programmer (Paul Lutus, author of Apple Writer, GRAFORTH, and others, who lives in a cabin in Oregon); and the fastest computer (the Cray-2 or the CDC 205, at about 400 million floating-point operations per second).

Then there are the people who made it all happen: the garage tinkerers, the IBM defectors, the chip designers, the programmers (begin-ning with Lady Augusta Lovelace, Lord Byron's daughter), the child prodigies (such as Eugene Volokh, earning $480 a week programming for 20th Century Fox at age 15), computer criminals, computer artists, and the people who create artificial intelligence. And, of course, there are lists: the 10 biggest failures in computer companies, the 10 smartest computer programs, the 36 motion pictures featuring robots (remember "Dr. Goldfoot and the Bikini Machine"?), the 10 most important computer languages (alphabetically, to avoid hate mail from programmers), and the 33 major corporations that dropped out of the computer business (General Mills).

One of the high points of the book is in the chapter on IBM ("Go Big Blue"). Through some sleight of hand, the authors were able to obtain and print the lyrics to the IBM fight song, "Ever Onward": ". . . We've fought our way thru/And new fields we're sure/To conquer, too/For the Ever Onward IBM!"

Although it is lively and amusing all the way through, I wouldn't recommend reading this book that way; there are several items that fit into different categories, and so are repeated in different chapters. However, it's a great book for browsing, quick entertainment, and general reference.

—*Orlan Cannon*

SYSTEMS

OLIVETTI PC SERIES

The Docutel/Olivetti Corporation has thrown its hat into the IBM-compatible marketplace with the introduction of the Olivetti PC series of personal computers which includes three standard models and one portable model. Olivetti says they are "the first major international computer or office products manufacturer to offer a microcomputer marketed as strictly IBM-compatible."

"Compatibility with the IBM Personal Computer has been a hot topic for a couple of years now, but major manufacturers have been unwilling to take advantage of the situation and offer an IBM-compatible product," says George Christian, computer product manager for Docutel/Olivetti Corporation, the U.S. marketer for Olivetti products.

"Docutel/Olivetti has the distribution and resources in place to quickly be a major factor in personal computers," contends Christian. "We think Olivetti PC products will have a dramatic impact on computer sales in the office products retailing environment."

The Olivetti PC computers have Intel 8088 microprocessors and use the MS-DOS operating system, and Olivetti says most popular business application packages written for the IBM run on the Olivetti PC series. "We've tested well over 100 of the most popular business packages with no problem," says Christian. "Even the popular Lotus 1-2-3, Version 1A, runs without modification."

Besides MS-DOS, which is supplied as part of the software bundle, the Olivetti PC computers will run CP/M-86, and the UCSD p-System operating systems. They can also handle compilers for C, FORTRAN, COBOL, and RM-COBOL.

The rest of the software bundle includes WordStar, along with SpellStar, MailMerge, StarIndex, InfoStar, DataStar, ReportStar, and CalcStar—all from MicroPro. You

also get PC-Tutor, a self-teaching tutorial for the system, and graphics-enhanced GW Basic.

Portable and desktop models in the PC series include built-in serial and parallel ports, internal disk drive controllers, and a video-display interface. Four expansion ports can accommodate a variety of IBM-compatible firmware such as color graphics boards, clocks, and I/O devices.

There are three non-portable models available. The Olivetti PC

Available in portable and desktop versions, the Olivetti series can run MS-DOS and CP/M-86 based software.

DT-1 has a detachable keyboard, 12" display, 128k memory, one floppy drive, and all the bundled software; it retails for $2895. Another model, the Olivetti PC DT-2 is the same as the DT-1, but includes another disk drive and retails for $3295. The third model, the PC DT/HD, includes a 10Mbyte hard disk system and one floppy drive—it sells for $4995.

The Olivetti PC P-1 portable model has one 320k disk drive and all bundled software, and has a suggested retail price of $2895. There is a PC-2 portable model that has two disk drives and retails for $3295.

FOR MORE INFORMATION:
DOCUTEL/OLIVETTI CORP., 5615 High Point Dr., P.O. Box 22306, Irving, TX 75062; (214) 258-5400.

Eagle Plus
Eagle Plus XL

Hardware and software compatible with the IBM Personal Computer and the XT, the Eagle Plus comes with one or two disk drives, the MS-DOS and CP/M-86 operating systems, and GW BASIC. Billed as highly compatible with IBM, the Eagle Plus XL has 10 Mbytes of hard disk storage, and 128k of main memory which can be expanded to 640k.

High-resolution monochrome and color graphics adaptor boards and monitors are available as options to the Eagle Plus and XL.

$2395 (Eagle Plus with one disk drive)
$2795 (Eagle Plus with two disk drives)
$4295 (Eagle Plus XL)
Eagle Computer Inc.
983 University Ave.
Los Gatos, CA 95030
(408) 395-5005
retail

MPF-II

Compatible with Applesoft BASIC programs and Apple IIe machine code-level programs, the MPF-II can run popular programs such as WordStar, SuperCalc, VisiCalc, and PFS.

With a 6502 processor, the MPF-II has 66k of RAM, and 24k of ROM. It also has graphics capabilities with a high-resolution mode of 280 by 192 pixels and six colors, and a low-resolution mode of 40 by 48 with 16 colors.

Featuring a total of seven interface ports, the MPF-II has interfaces for both monitor or composite NTSC-type color television interfaces. It also includes a cassette interface, a Centronics printer interface, and a joystick interface. Optional features include a floppy disk interface, and an Apple IIe-compatible slot for expansion.

$599
Multitech Industrial Corp.
315 Fu Hsing N. Rd.
Taipei 104, Taiwan
Republic of China
retail

PERIPHERALS

Smith·Corona D·300

Already established in the personal computer printer market with its daisy-wheel models, Smith-Corona now adds a line of dot-matrix printers headed by the introduction of its D-300 dot-matrix printer.

"Our first dot matrix printers are building blocks toward a comprehensive, competitively priced line of both dot matrix and letter-quality models that will address the many computer applications for consumers and business," says L. Walter Wright, a vice-president at Smith-Corona.

As the top model in its dot-matrix printer line, Smith-Corona's D-300 prints at a speed of 140 characters per second (cps), and can print at a width of 132 columns (at 10 pitch).

Versatility is the keyword for the D-300—it features a choice of six different pitches, a choice of emphasized or elongated print, and proportional spacing. The D-300 also offers an italics character set, bit-image graphics with a resolution as high as 120 dots per inch horizontally, "true" descenders for alphabet characters, superscripts and subscripts. A 96-character ASCII character set also allows you to print in six foreign languages.

With a 2k buffer, the D-300 offers both friction feed and tractor feed, as well as bidirectional printing, shortline seek, and vertical and horizontal tabs. Shortline seek is a feature that helps speed things up: when a line of text to be printed doesn't span the width of the page, the printer does a carriage return at the end of the text on that line and goes to the next line.

The D-300 can print in near-letter-quality mode, and its character matrix size in this mode is 17 horizontal pixels by 16 vertical. In standard mode, the pixels measure 9 horizontal by 8 vertical. Dots-per-inch resolution can be set at 60, 72, or 120 horizontally. The D-300 has interfaces for parallel and serial hookup, and a self-test capability.

Capable of near-letter-quality performance, the D-300 dot-matrix printer can print at 140 cps.

Available through Smith-Corona's nationwide network of office equipment, typewriter and computer dealers, the D-300 dot-matrix printer carries a suggested tab of $795.
FOR MORE INFORMATION:
SMITH-CORONA, 299 Park Ave., New York, NY 10017; (212) 752-2700.

DVM·III
Fitting into slot #7 on the computer, this card reproduces on RGB monitors the video modes that the computer is capable of displaying on NTSC or composite monitors.
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HP 150 Internal Modem
Fully compatible with all Hewlett Packard software for its 150 model, the HP 150 internal modem fits into one of the expansion slots and transmits at 300 or 1200 baud. It includes such features as auto-dial and auto-answer, an internal speaker for monitoring of the phone call, and tone or rotary dialing. To provide compatibility with most computer services, the modem operates in full- or half-duplex modes.
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BITS & PIECES

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The second tier holds fan-fold paper which feeds through a slot in the closed back to the printer above it. You can also use this tier to store software and some peripherals. Underneath the second tier is room to cover a keyboard or disk drive. The entire DeskMate unit measures 36″ by 13″ by 12″ and weighs 15 pounds.

With slotted joints and pre-drilled holes, the DeskMate is designed to assemble easily and provide solid

Featuring a rotating shelf for the CRT, **DeskMate easily organizes system components.**

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Available by mail order, the DeskMate sells for $44.95 plus $5 shipping.

FOR MORE INFORMATION:
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BUSINESS

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Innovative Software has introduced three new integrated software packages called The Smart Data Manager, The Smart Word Processor, and The Smart Spreadsheet with Graphics. All three run on the IBM Personal Computer and compatibles.

The Smart Data Manager gives the user complete control of the data from start to finish and allows the creation of various filing systems, the generation of reports, forms, and files, and the creation of mailing labels and invoices. The program provides multiple screens for each file and 12 field types for data validation and range checking.

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has relational file-transaction capabilities, which allows changes in the contents of one file to affect the contents of another file. Multifunction selection and retrieval can also be performed.

The Smart Word Processor has windows that allow multiple documents or parts of documents to be seen on-screen, permitting easy block moving and copying between documents or within parts of one document. Graphs and charts generated using the spreadsheet/graphics program may be included within a document and surrounded by document text.

The word-processing program includes visual print features such as boldface, underline, and overstrike, which may be seen on-screen before printing. A document may include characters of different fonts, sizes, and colors, and the program incorporates "flying reform," allowing paragraphs and entire documents to be reformed as they are edited.

The Smart Spreadsheet with Graphics program is designed to handle large amounts of data in many formats while performing many different commands. The program memory continues from day to day and can hold as many spreadsheets in memory as the computer has space available, with the largest spreadsheet being 999 columns by 999 rows.

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All three packages have a built-in project or command processor which will allow a series of tasks to be done in series without user intervention. The programs can be integrated for more effective project processing since the command processors can initiate sequences of commands and pass them to the next processor.

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Smart Spreadsheet with Graphics programs run on MS-DOS, CP/M, and UNIX systems. The Smart Word Processor retails for $475; the other two programs retail for $595. Prices include free updates for one year and a $100 coupon toward the purchase of one of the other Smart programs.

FOR MORE INFORMATION:
INNOVATIVE SOFTWARE, INC., 9300 W. 110 St., Suite 380, Overland Park, KS 66210; (913) 383-1089

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EDUCATION

SPINNAKER EDUCATIONAL GAMES

Spinnaker Software has introduced four new educational programs for children and adults which combine learning with the enjoyment of playing a computer game. These newest entries represent a part of Spinnaker's expansion to a "family" product line.

Alf in the Color Caves and Kidwriter are part of the Early Learning Series for children. Trains enlarges the Learning Adventure series, and Jukebox expands the Family Learning Series line.

Alf in the Color Caves is designed to use fun and easy play to help children in their first experience with computers. Children learn the basic skills of navigation, form and shape recognition, and prediction as they are entertained by Alf and the colorful graphics. The game has progressively difficult levels of play for children ages 4 to 7.

Kidwriter is a storytelling tool which allows children to create their own stories using both pictures and words. A menu makes 99 different characters available for placement on a variety of colorful backgrounds. Figures like people, clouds, trees, cars, and robots are at the command of the player as he changes their color, size, and position on the screen.

Trains lets you assume the role of a business tycoon in the late 19th century managing your own railroad. This game introduces players to the principles of running a business. The object is to service the industries of the Old West by bringing ore from the mine to the factory, lumber from the forest to the sawmill, and so on. Bills must be paid, priorities set, and deadlines met in order to stay in business and expand the railroad empire.

Jukebox is a game of fancy footwork and music. The goal is to collect solid gold records by gliding a pair of dancing feet from square to square. Every time a player enters a square, a record either appears or grows larger. When a flashing gold square appears, the player must be quick, for the record is about to turn "solid gold." There are restrictions on where you can move, and certain moves spell disaster.

All four programs carry a list price of $39.95 and are available through retail outlets. Additional versions for Apple and IBM computers are planned.
FOR MORE INFORMATION: SPINNAKER SOFTWARE, 215 First St., Cambridge, MA 02142; (617) 868-4700

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Psi Lab includes ten different
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Petro-Search lets you use your
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Free Response Psychokinesis
challenges you to control the
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cause random events to form a
pattern of your choosing. The
program creates different pictures
using a grid of black and white
squares. You can concentrate on
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then when you're ready, press any
key to activate the computer's
random generator. Your goal is to
make the random patterns of black
and white conform to the original
drawing, with the computer keeping
track of your hits. You can also
create drawings of your own.

Psi Lab's other programs include a
confidence matching test, a color
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The Psi Lab package runs on the
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ADVERTISING STAFF

Steve Jobs On The Future Of Apple Computer

A standing ovation from an over-flowing crowd of 3000 employees and stockholders greeted Steve Jobs, chairman of Apple Computer Inc., at the company's annual financial meeting on January 24. Such enthusiasm may seem out of the ordinary, but then Apple is no ordinary company. It's a company with a vision—to bring personal computing to the masses. Jobs himself has spread that vision, making it an almost evangelical mission for his company.

We interviewed Jobs in the fall, before the Macintosh computer was introduced, on Apple's future and the future of personal computing. The following questions and answers were excerpted from that interview.

Your company has a reputation for taking innovative risks, the latest being the Macintosh computer, but aren't you taking a gamble by introducing a computer that's not compatible with the IBM Personal Computer, by not jumping on the IBM PC-/MS-DOS bandwagon like so many other personal computer manufacturers?

Jobs: Of course we're taking a gamble. It's the only right gamble we can take. IBM is going to come out with a portable next year; when they do, what's going to happen to Compaq (a manufacturer of an IBM-compatible portable) then? IBM is going to come out with a proprietary version of their operating system that other companies aren't going to be able to go to Microsoft and buy. IBM is going to introduce their own windowing package, which is why they didn't sign on Microsoft Windows. I don't know what is going to happen to Windows, or to VisiOn, but IBM's windowing

Photographs by Carol A. Foote

If you're tying your future to IBM you'll get stepped on, because they want it all.

package will be the standard. We hear it is not that great, but it will be the standard. So, if you're tying your future to IBM, you'll get stepped on because they definitely want it all. There's no question about that.

Your Macintosh team talks about reaching that large group of people who are not yet participants in the personal computer revolution. How do you plan to reach them?

Jobs: We think there are three things that you have to do. First, you make computers simple. It takes 40 to 100 hours to learn how to use an Apple II. That may be acceptable to a spreadsheet junkie, but to a person who is going to be using a personal computer maybe half an hour a day, or maybe an hour a day, you will not get that person to spend 40 to 100 hours learning how to use a computer. So, even if the MIS department or the data-processing department plops a computer on their desks Monday morning, it might sit there for six months and not get used. It's an incredible waste. Ease of use is vital.

The second thing is power. You have to have a really powerful computer. People want to do really sophisticated things: They want to mix
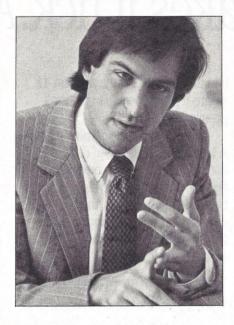
fonts in their business letters; they want to make diagrams; they want to make business graphics and paste them into their documents. So, the computer must be very powerful.

The third thing is that it must be inexpensive. What we are trying to do is make personal computers into appliances for the office, if you will—as commonplace as the telephone. If we are to do that, they are going to have to be in a price range where they are an insignificant cost around the office.

Macintosh delivers significant value for its price, but not without some compromise—lack of ability to expand, for example. Why are you cringing at the word "compromise"?
Jobs: Because I disagree with you. When we designed the Apple II, the concept of customizing your machine was that you could add hardware to the computer to customize it. In 1977 it cost about $100 to build a microprocessor system with RAM and ROM. If we were going to expand it with hardware, the way we were going to do it was share the one microprocessor using expansion slots.

Today, you can buy a single-chip micro for, say, $5, and so there is no point in sharing that one micro in the box. You can add microprocessors on each peripheral device. Printers have micros in them; modems have micros in them; everything has micros in them. And the most efficient way to communicate is serially. So, we think those one megabit per second *serial ports* are an *incredible* way to expand Macintosh in a way that beautifully partitions what is in Macintosh and what is in the peripheral. And RS-232 is a universal communications standard between peripheral devices, printers, modems, and the like. So we think that Macintosh is really expandable.

Most of the things that you have to add on to other computers are already built into Macintosh: voice, sound, speech, clock calendar, two super-high-speed serial ports, local

What we are trying to do is reach the point where the operating system is totally transparent.

area networking, disk drives, and graphics processing. It's all built in. That takes care of most demands, and the remaining needs the serial ports can easily interface to. Nobody has come up with a single thing that a Macintosh can't very successfully connect with.

You've been quoted before as saying that MS-DOS is last-generation technology. How are operating system advances changing personal computers for end users?
Jobs: You can't do Macintosh-like things on an IBM Personal Computer, partially because of the hardware, partially because of the software. It is 1970 software.

What we are trying to do is reach the point where the operating system is totally transparent. When you use a Lisa or a Macintosh, there is no such thing as an operating system. You never interact with it; you don't know about it. Users are much more concerned about what the computer will do, what it will communicate with, which is the right way of looking at products.

Let's go back for a minute to the subject of personal computers in the office. There are forces at work within corporations which are trying to swing the pendulum away from personal computing back to corporate, institutional computing. Why is this happening, and what do you think can be done to change it?
Jobs: The problem is that as personal computers began to proliferate in the office, from the bottom up, you had people who were looking at life from the top down. They became concerned—for valid reasons. They wanted these things to be able to talk to each other; they wanted to hook the personal computers up to mainframes and implement electronic mail—all valid concerns. Today's personal computers aren't very good at those things.

Unfortunately, most of those people were not intimately familiar with personal computing. In general, there

Introducing Macintosh.
What makes it tick. And talk.

Well, to begin with, 110 volts of alternating current.

Secondly, some of the hottest hardware to come down the pike in the last 3 years.

The garden variety 16-bit 8088 microprocessor.

Macintosh's 32-bit MC68000 microprocessor.

Some hard facts may be in order at this point:

Macintosh's brain is the same blindingly-fast 32-bit microprocessor we gave our other brainchild, the Lisa™ Personal Computer. Far more powerful than the 16-bit 8088 found in current generation computers.

Its heart is the same Lisa Technology of windows, pull-down menus, mouse commands and icons. All of which make that 32-bit power far more useful by making the Macintosh™ Personal Computer far easier to use than current generation computers. In fact, if you can point without hurting yourself, you can use it.

Now for some small talk.

Thanks to its size, if you can't bring the problem to a Macintosh, you can always bring a Macintosh to the problem. (It weighs 9 pounds less than the most popular "portable.")

Another miracle of miniaturization is Macintosh's built-in 3½" drive. Its disks store 400K—more than conventional 5¼" floppies. So while they're big enough to hold a desk full of work, they're small enough to fit in a shirt pocket. And, they're totally encased in a rigid plastic so they're totally protected.
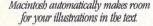
And talk about programming.

There are already plenty of programs to keep a Macintosh busy. Like MacPaint,™ a program that, for the first time, lets a personal computer produce virtually any image the human hand can create. There's more software on the way from developers like Microsoft,® Lotus,™ and Software Publishing Corp., to mention a few.

And with Macintosh BASIC, Macintosh Pascal and our Macintosh Toolbox for writing your own mouse-driven programs, you, too, could make big bucks in your spare time.

You can even program Macintosh to talk in other languages, like Yiddish or Serbo-Croation, because it has a built-in polyphonic sound generator capable of producing high quality speech or music.

The Mouse itself. Replaces typed-in computer commands with a form of communication you already understand — pointing.

Some mice have two buttons. Macintosh has one. So it's extremely difficult to push the wrong button.
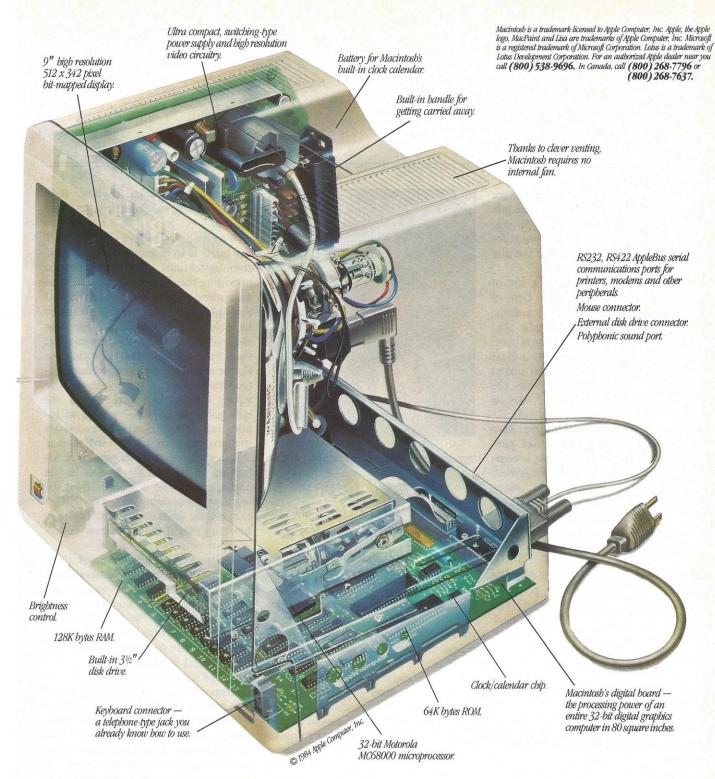
The inside story — a rotating ball and optical sensors translate movements of the mouse to Macintosh's screen pointer with pin-point accuracy.

All the right connections.

On the back of the machine, you'll find built-in RS232 and RS422 AppleBus serial communication ports. Which means you can connect printers, modems and other peripherals without adding $150 cards. It also means that Macintosh is ready to hook in to a local area network. (With AppleBus, you will be able to interconnect up to 16 different Apple computers and peripherals.)

Should you wish to double Macintosh's storage with an external disk

Macintosh automatically makes room for your illustrations in the text.

MacPaint produces virtually any image the human hand can create.

Microsoft's Multiplan for Macintosh.

9" high resolution 512 x 342 pixel bit-mapped display.

Ultra compact, switching-type power supply and high resolution video circuitry.

Battery for Macintosh's built-in clock calendar.

Built-in handle for getting carried away.

Thanks to clever venting, Macintosh requires no internal fan.

RS232, RS422 AppleBus serial communications ports for printers, modems and other peripherals.
Mouse connector.
External disk drive connector.
Polyphonic sound port.

Brightness control.

128K bytes RAM.

Built-in 3½" disk drive.

Keyboard connector — a telephone-type jack you already know how to use.

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32-bit Motorola MC68000 microprocessor.

64K bytes ROM.

Clock/calendar chip.

Macintosh's digital board — the processing power of an entire 32-bit digital graphics computer in 80 square inches.

drive, you can do so without paying for a disk controller card—that connector's built-in, too.

There's also a built-in connector for Macintosh's mouse, a feature that costs up to $300 on computers that can't even run mouse-controlled software.

One last pointer.

Now that you've seen some of the logic, the technology, the engineering genius and the software wizardry that separates Macintosh from conventional computers, we'd like to point you in the direction of your nearest authorized Apple dealer.

Over 1500 of them are eagerly waiting to put a mouse in your hand. As one point-and-click makes perfectly clear, the real genius of Macintosh isn't its 32-bit Lisa Technology, or its 3½" floppy disks, or its serial ports, or its software, or its polyphonic sound generator.

The real genius is that you don't have to be a genius to use a Macintosh.

You just have to be smart enough to buy one.

Soon there'll be just two kinds of people. Those who use computers. And those who use Apples.

has been a transition period where those people have had to become familiar with personal computing, and some of them have done so more successfully than others. We are in a transition period right now.

We are going to learn a lot of lessons over the next year. One of these lessons is if people in a data-processing department decide that they are going to place personal computers around a company, unless there is a lot of support and unless they are quite easy to use, they are going to be putting a lot of iron on desks that will sit there and rust.

To date, personal computers have primarily been an individual purchase, so anyone who bought a computer was already highly motivated.
Jobs: That is exactly right. Now, both modes are going on, and all too frequently the DP managers don't understand the difference in motivation or the importance of individual motivation.

Our model is a very simple one: We think you can make very powerful *individual* workstations, and then you can make them all talk to each other through a local area network, and then you can put what we call servers on the local area network. The cost of the servers can be amortized over the users. These servers include laser printers, file servers, communications servers. It is a pretty simple concept.

In computers, if things aren't pretty simple, they don't work.

If you build systems that are really complicated, they just don't work over time. We have to keep the models very simple. We don't need the fanciest local area network in the world, we just need one that works.
Do you believe local area networks are practical now?
Jobs: These dreams have been around for nearly a decade, and you still can't buy them today.
Certainly, there are thousands of networks installed and working . . .
Jobs: You still can't simply buy a

We need to pay more attention to the person. . .who is scared about using a personal computer.

bunch of computers, hook them up across a local area network, buy a laser printer, buy a file server, and have them share data. You can't do that today—unless you are willing to spend hundreds of thousands of dollars, and it's not even clear you can do it then. Part of our dream is to make that dream a reality, but at a cost that departments can afford, that small companies can afford, and that universities can afford; at an incredibly unprecedented price point.
How far are we from realizing that?
Jobs: We are within 12 months of being where we want to be.
What advice would you give to an MIS director who's planning to purchase and implement personal computers?
Jobs: A really exciting thing to do is to put personal computers on a lot of desks and to link them and have them be usable in a stand-alone mode, but

also have them linked together to a place where information can be shared.

We obviously believe that if one of our goals is to improve the quality of communications, then in addition to providing the capability to create diagrams and memos using graphics and multiple type fonts, we also want to be able to link computers together electronically. We absolutely support that, but what is essential is that we tie the *right* computers together electronically, because if you tie the wrong computers together, you are still going to be sending around inadequate communications, and sharing programs that are hard to use. What we need to do is pay more attention to the person buried in the organization who is scared about using a personal computer, who will let that one he finds on his desk Monday morning rust if it's not a new generation of personal computer.

The task is to take some of these thoughts and plans people have about linking personal computers together and realize that while that is an accurate thought, the workstation at the end of that wire had better be one that the person can really use rapidly and easily. If that is done, then we'll truly see some of these dreams realized.
The hardware and the tools aside, one of the reasons that personal computing, the concept, took off was that the corporate data base wasn't providing what management needed. So, merely tieing people into that data base isn't going to solve many problems, no matter how easy it is.
Jobs: There is a concept of an information center growing in the MIS world. This is a center for information that is updated, sometimes hourly or sometimes nightly. It is a sort of a "read only" information center where, through a telephone link or a local area network or some form, computers can access a common data base, get some fairly up-to-date information, and then manipulate it

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Sargon III provides the most complete and informative user manual, making it easier for the novice to learn. It includes diagrams from the U.S. Chess Federation, suggestions for better play, and descriptions of 107 great games of history.

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So visit your local retailer and ask for Sargon III by name. Or call 1-800-343-1218 (In MA 617-937-0200). Hayden Software, 600 Suffolk St., Lowell, MA 01853.

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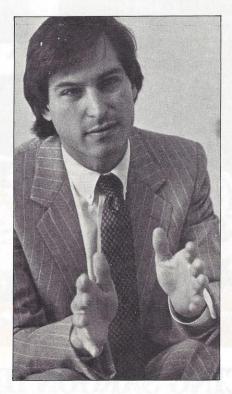**SARGON III** ™

HAYDEN SOFTWARE

CIRCLE 108

locally to reach conclusions. Things like those concepts are becoming more and more viable. They're exciting.

You told **Personal Computing** *that Macintosh is the future of Apple. Can you expand on that?*

Jobs: Sure. We have two families of products—the Apple II family and the Apple 32-bit system family. We are spending as much money on R & D for the Apple II family as we are for the 32-bit system family. As you know, the Apple II is still the highest volume selling computer in the world, with the exception of the real low-end stuff. We're going to sell a lot of Apple IIs this Christmas. (Actual sales hit 110,000, the largest number of Apple IIs sold in one month in the company's history.) As you know, the Apple II is more and more being targeted as an educational—K through 12, in particular—and home computer, even though it has a lot of uses in the office and small business. It has an incredible software base, so we expect that Apple II sales are going to continue to increase in the next few years. The price has come down. You can buy an Apple II for about $1395, and that includes the whole system— 128k, color monitor. About a year ago, it would have cost about $1995.

But it is not a static product by any means . . . you'll see us do a variety of interesting things in the next year that will increase the family of Apple II products that run Apple II software, in interesting ways.

So that is going to be a billion-dollar-plus product line for us, but that is not going to propel us to become a $10 billion corporation. Macintosh is going to be Apple's next milestone product in the industry— the Apple II being the first one in 1977, the IBM Personal Computer being the second industry milestone in 1981, and Macintosh being the third industry milestone in 1984. In that sense, Mac will be the next wave of Apple's growth. I think, ultimately, that the Lisa technology, that Lisa

> *Computers. . .are going to give way to products that you can learn to use in 20 minutes.*

and Macintosh are based on, will be Apple's technology for the 80s.

A quote attributed to you, roughly, is that using a personal computer is like eating at McDonald's; you have to get your fingers greasy. Is that true any longer?

Jobs: It's not true at all. The crank of the car gave way to the electric starter; the slide rule gave way to the electronic calculator. Personal computers, as we know them, are going to give way to products like Lisa and Macintosh, where you can learn how to use them in 20 minutes. People never learned how to use a slide rule. Most people didn't, at least. Almost

everyone knows how to use a calculator. So that is the way I see things happening.

What are your goals for Apple?

Jobs: We don't express our goals in financial terms, but let me give you an overview. If you ask industry forecasters how big our industry will be coming out of the 80s, they will generally tell you it will be at least $30 to $40 billion dollars. To be an industry leader, we are going to be at least a $10 billion corporation.

So you're anticipating a 30 percent market share?

Jobs: To be an industry leader, that is virtually a definition. Now what is exciting to us is this: Most corporations, as they reach the level of a few billion dollars in sales, become plain-vanilla corporations. They lose their corporate culture; they lose their soul. They add a lot of people, and a lot of process. We are trying not to do that. We need a little more discipline, but what we do not need is a lot more levels of management. What I think the senior-level management will be measured by in six or seven years is not *did* we grow to $10 billion, but *how* did we grow to $10 billion—the quality of the $10 billion corporation. And our challenge is: Can we grow to be a *great* $10 billion corporation?

How do you measure greatness?

Jobs: By being able to keep the incredibly talented group of technical people . . . we have the most talented technical people in the world. There are people who don't like to work in large organizations. They don't like to have to convince 10 other people that their ideas are right. We have some of the most talented marketing people in the country, and these are people who don't want to work four levels down. These are people who want to express their ideas, get funding, and go. We have to keep that Apple spirit alive; we have to continue taking risks on the key players and not let Apple mushroom into a giant bureaucracy, which is what happens to most companies.

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And its low price makes it easy to buy.

$449 for Atari. $329 for Apple.

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The drive will be well worth it.

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Who (And What) Is A Nerd?

How people achieve nerdiness and
never know it's happening

by Barney Cohen

The image is indelible: White polyester shirt with a plastic pocket protector for pens. Black or horn-rimmed glasses, taped where they've been broken. Black or tan chino pants. And some kind of personal computer.

There is something about computing that brings out the nerdiness in people. In fact, not since the high-obtuse, early 60's has the disease been so widespread. And *never* has it been so finanancially remunerative.

Look around. Bantam-weight myopics whom your lame cousin Kitty wouldn't date are now driving Bimmers and having their taped-up specs fogged by bathing suit models. Guys who spent the 70's cataloging the batting averages of Seattle Mariners or obliterating mother ships and main battle tanks are spending the 80's going public. What makes these guys tick? (Not to mention chime, buzz, ring, and repeat.)

To paraphrase Shakespeare (no literature nerds need write corrective letters), some were born nerdy, some achieved nerdiness, and some had nerdiness thrust upon them.

We have tapped into the private frequencies of three such case histories. Not millionaires (yet), these are the rank and file of the afflicted; garden variety nerds. They are, you will

Barney Cohen is a New York-based free-lance writer.

see, quite different and individuated. They are also, you will see, quite nerdy.

Roll tape.

What's in a nerd? "In contemporary parlance," Phil Koopman bristles, "I suppose that means a jerk."

Koopman, 50, is sitting cross-legged in a chair in the small upper room of his triplex condominium in suburban New Jersey. He is not a jerk. But he *is* slender, sallow and carries a pen in his vest pocket. His upstairs room is littered with the scavenged carcasses of disemboweled computers. He is a matrimonial two-time loser. If nerdiness were a felony, Phil Koopman would be wanted in 50 states.

As it is, he is wanted by a similar number of companies that want the good stuff that flows from the upstairs room.

Koopman isn't a programming nerd. Though he runs a language house specializing in FORTH, he is no direct threat to security at NORAD. Nor would he want to be.

Koopman is a computer hot rodder. To continue that automotive metaphor, he's the type who stuffs an old VW with enough speed goodies to blow the doors off its neighbor's Porsche. He'll stuff yours too, for a price.

Using a single board from a home computer so simple that he blushes

when he reveals the name (top secret—but suffice to say that it is your basic alien blaster unit), Koopman tweaks up 130k of source code (using FORTH) to generate what he says is "the computing power of a DEC minicomputer that could cost $10,000."

The Koopman unit, which sells for a lot less, can run just about every applicable function of a large hotel. "It's a combination of programming made to suit a computer architecture which is in turn custom crafted to suit the needs of the programming." He smiles that nerdy smile, something between Peter Lorre's "M" and Lily Tomlin's "Ernestine the telephone operator."

The unit is the latest in a long line of Koopman "specials" which were built in garages and back rooms, or major labs (for example the U.S. Navy's), over the past three decades of computer history (which is roughly all of computer history!).

Koopman is that number-crunching rara avis, the old time hardware nerd. "Wozniak? He's just a hacker," Koopman says. "He didn't design a computer. He just designed the Apple. The actual computer is the microprocessor. The guy who designed that designed the computer. After that it's just a mechanized process. The real creativity today is in the marketing." When you go back as far as Koopman, it's a lot easier to

put all the computer booms and boomlets in perspective.

"When I was in high school computers were unknown. In fact, even in college (Universities of Nebraska and Pennsylvania) Boolean Algebra was taught as a graduate class in math and as a theory, only with no practical application. Now, of course, Boolean is what's used to design computers with. Back in 1953," (after Koopman returned from a stint in Korea) "I began using Boolean to design real circuits with relays and vacuum tubes."

Koopman suddenly goes scurrying about the small room and eventually turns up a dog-eared old technical manual. "You see," he says, the grin turning more Lorre than Lily, "the telephone relay system had been in place since 1860 or so. It had started out really as a fire and burglar alarm system for banks and whatnot, and the early phones were hitched up to these lines." It was an early form of datalog network.

"But the circuitry was always done by mechanics, trial and error, cookbook and experience; never mathematically."

Koopman was working as an engineer for such an alarm firm when he read this book he'd unshelved. "I was immediately turned on by it. *The Design of Switching Circuits* by Keister, Ritchie and Washburn. Put out by Bell Labs."

Koopman put the stuff right to work and did well enough by it so that in two years, his name appeared in the first "Computer Directory," a sort of who's who put out by *Computers and Automation*.

"Oh, in the beginning it was the plain, sheer joy of learning. Everything was new. There was ENIAC (a forerunner of UNIVAC) but it filled whole rooms. And nobody ever heard of it anyway.

"You couldn't tell people what you were interested in. Nobody understood. The guys you were working with did, but no one else. I'd tell girls,

'I'm an engineer.' I'd tell them I designed fire alarms and burglar alarms, which was true of course but . . ." Koopman lets the thought trail off.

He goes downstairs and makes another round of instant coffee. When he comes back he hasn't quite salved the bite of nostalgia.

"It was obvious that with the monitoring systems beginning to monitor machines and breakdown, the datalog process was growing. With stuff like ENIAC, it was obvious that the calculating process was growing, too.

Phil Koopman is "an old-time hardware nerd" who says that Steve Wozniak of Apple Computer is "just a hacker."

Computing is just calculating with programming. It was very clear where all this was leading. Sometimes I just burned to be able to tell people what the future would be."

A year later, at age 23, Koopman was hired to head up engineering for Ohio Sprinkler, another fire alarm firm. "They gave me $160 a week salary and a big, white Lincoln Premier with white leather interior.

"My girlfriend had moved to Moline, Ill., and I was commuting. The Lincoln was good for that. The Ohio Turnpike had just been built. Saved me a lot of time."

Isolation is the nerd's element. He hunts (and pecks) in packs of one, or in small groups that function as loosely jointed alliances of packs of one.

There is a subgenus that does this to escape, as young women once took the veil. They become nerds in self defense, against baseball, against *Gentleman's Quarterly*, against pert young things who want to sap their vital fluids.

Since there is a pert young thing downstairs washing out Koopman's cups of instant coffee, we suspect that he is of the higher species. There are nerds who would *like* to be just like everybody else but find, as the Werewolf of London did, that there are some things you just can't fake. When the moon's up, the hair's out.

Koopman suggested his new company make a deal with Monroe. "They made a calculator, so I worked up a concept for a desk-top computer (in 1957) based on an assortment of sprinkler system stuff and the Monroe gear.

"Well, they got all excited and ran a market survey for the possibility of a desk-top computer, and the survey turned up a potential market of about 1000. A thousand people!"

Plans for the desk-top computer were shelved, and then UNIVAC came out. "That changed things. I remember it claimed to be the world's first programmable electronic computer," but what was even more important to Koopman was, "it piqued some curiosity."

Koopman continued to march on a parallel road to the slow advance of practical computing. He went from Ohio to Philco, where he continued to work on "correlative devices." And then he got out.

"I was fairly well known in the business, and so I decided to consult." Now he was able to pick the jobs that excited him.

"I designed an alarm and datalog system for a company that used IBM Selectrics for printouts. That was very nearly a computer. It looked like one and worked like one, and looking

Some were born nerdy, some achieved nerdiness, and some have nerdiness thrust upon them.

back on it, the thing was in many ways a special-purpose computer. More than a half a million dollars worth of those babies went into the Ford Plant in Dearborn," he recalls, "and the thing appeared at the Toronto World's Fair." *Sic transit Gloria*, and all the rest of the girls.

The rain is beginning to fall against the bubble plastic skylight above Koopman's little room. Why do condos always feel so wet in the rain?

"More coffee?" he grins. Life spins madly outside the little upstairs room. We yearn to get back to it. We get more coffee, instead.

The rest of the Koopman story is one boring success after another with the big-bang success always slipping away or behind. There was a Navy contract to crack radar codes. Well done. There was "the first all tri-state logic micro programmed to restructure its internal architecture (within limits) for each command." It was, says Koopman, "I guess the only real computer I ever designed."

What's next? "The quantum leap may come in materials," says Koopman, "but more likely it will come in computer architecture. The big breakthrough involves what's called Von Neuman architecture. It's a continuous flow instruction process. Rather than going to memory, doing their thing and returning, these data can be a mix of instructions and data in the true sense. It's all done sort of on the run. Very high speed. The Japanese claim to have one up and running." Koopman turns solemn: This is it!

Koopman isn't working on one. "I'm 50. I'm unemployable. And you need a lab for the circuitry." And barrels of dough. Koopman nods. Barrels of dough. "IBM spent millions on the Josephson super-cooled, high-speed switch and worked years, and they've just abandoned it. Imagine that."

Koopman smiles and shakes his head. "I'm doing what I want to do,"

he says as he flicks on his hot rod computer and holds the keys out for a test ride. "At my age, if I'm not enjoying what I'm doing then I'm a fool." We want to say "Amen," but we'd be wrong. The old psychiatric saw goes, "Neurotics dream of castles in the air, psychotics live in them. Add to this that nerds build them and rent them out. Good luck, Koop.

* * *

Now take the case of Nick Egleson, age 38. He sits in his small office above a paint store on Manhattan's West 72nd Street, and as he swivels in his huge office chair he, like Koopman, bristles at the word "nerd."

Indeed, in his vested wool worsted and rep tie, he looks like anything but. Still, he is willing to give the matter some thought and, after a quick tour of his hardware and software consultancy business (and a quick chat with his partner), Egleson confesses to being afflicted with a mild form of nerdiness. Apparently there is something about being a nerd that strikes and incapacitates the self-awareness nerve in the first wave of the fever. Egleson admits to that, too.

What puzzles Egleson is how he became a nerd. He *knows* how he got into computers . . .

"I was doing films and audio visual materials on occupational hazards . . . for use on shop floors or in union halls, and this involved long and arduous grant proposals. The Ford Foundation asks you to file 80 pages worth.

"Well, a lot of these proposals were similar, but there were subtle variations. So I learned how to adapt and flow basic word processing, you know?

"Then one day I joked to my father-in-law that I could probably use a computer to do this, and it turned out he was just about to give up on one that he'd been building from blueprints. This was about 1978 I guess, so the thing was fairly advanced. And he said if I could fix it,

I could have it. It was a boards-up kind of thing, but I took it and I worked on it for about a year.

"I talked to friends who knew a lot. I read books and manuals. And eventually I got it put together. But there was no printer, so we bought an old airline ticket printer filled with switches on cams and cables and which was designed to work with a mainframe, and I worked out an interface that allowed this thing to work with the computer. You wouldn't do it now. These things can be bought for less than it cost me to build mine." Note the strain of martyrdom—it's another symptom.

"But the thing was that by the time I finished it all and had it up, I had already written the proposals! And then *Reagan* got elected."

The bottom dropped out of the grant business, in fact the bottom dropped out of the whole public-consciousness-filmmaking market. Egleson had adapted the computer (and a lot of other equipment he'd picked up along the way) to the selling and making of his AV's, and now there just weren't very many to make or sell.

"Well, one day one of our clients, the Cathedral of St. John the Divine, came down to look at one of our AV's about fund raising for social programs. But what they became interested in was that we used computers for our writing and our budgets and whatnot. They had just come from ComputerLand, and they were utterly confused about what equipment to buy, and they asked if we could help them. I looked at my partner and said, 'Sure.'

"They needed a system that would tell them who gave, the purpose of the gift, the nature of the thank-you letter, and things like that. It was a programming and hardware job."

Egleson had become both programmer and hardware man, self-taught. Now he saw a way to make a living out of it. "I wrote a program I called the Donor Management Sys-

ESSAY

tem. It was tailored for CP/M and for a system made up from boards from the California Computer System. Then we hooked up a terminal from TeleVideo, printers from Epson Diablo, and disk drives from Shugart, and then we made all the pieces talk to each other (no mean trick), incorporated ourselves as Metrotech, had some labels printed, slapped them on, and turned the thing over to the Cathedral."

Then Metrotech took out some ads in a fund raiser's trade paper, "and we've been consulting the non-profits ever since."

Did he become a nerd somewhere along the line? "I don't know," he says, reaching for his coat. "How about some lunch?"

Lunch is set at Rikyu, a Japanese restaurant on Columbus Avenue, Manhattan's freshly minted Via Veneto for the new business class. The girls are swathed in business suits by Beene and such, and shod in Adidas and so on. The boys wear Perry Ellis and try to look hard, cerebrally. Egleson looks neither out of place nor quite at home on this street.

Fish is served, raw, fried, and drenched in vinegar. The couple to the right is hard at it. She is talking about what she'd like to do with her division. He's talking about what he'd like to do with *her*. Neither are getting through. Egleson, however, is making some headway.

"My father built a box with switches to illustrate that old story about the farmer with the boat and the fox and the goose and the feed. You know, the one that goes: 'He can only take one thing at a time and if he takes the fox, the goose eats the feed.' Depending on which way you threw the switches, you got either the green light for 'go' or the red 'gobble' light.

"Modern computers are just like that box but multiplied a million times, and silicon chips do the switching."

Maybe that's it; but no. "In grade school, I remember reading a paper-

back book about the history of computers." But now he can't recall the name.

In high school Egleson got involved in the theater club. He didn't do science fairs, didn't join the future mad scientists club. "I didn't think of myself that way."
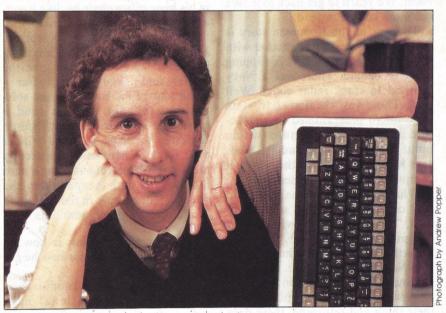
He was on the debating team. He was the photographer for the school newspaper. He published the school literary newspaper. He fell in love. "But she went to Temple and I went to Swarthmore."

At Swarthmore Egleson got in-

volved with that school's newspaper, and through that with a tutorial being organized in an all-black area of Maryland's eastern shore.

"There were beginning to be demonstrations about the integration of a bowling alley. The night I got down there I just couldn't believe my eyes. The people were so poor; their houses had no foundations, but were raised up on cinderblocks. You could look under the whole black part of town from one side of it to the other. And there was martial law. I was on curfew! It changed my life."

Egleson became radicalized, indeed he became a footnote to history. Vietnam was bubbling up. Egleson returned to Swarthmore and led a rally that got a quarter of the school population busted.

During this radical period, however, Egleson quietly admits, "I got to know a little about telephones." Here, nerdiness was thrust upon him.

You may remember a lot of talk about "black boxes" and "blue boxes" and a host of schemes and instruments designed to, in Egleson's words, "liberate Ma Bell."

Nick Egleson, partner in a computer consultancy business, says that not everybody "needs" a computer. Some do have a use for them, but others simply have a notion.

"In fact," Egleson remembers, "the people breaking dial and getting through and making these things all happen were called 'hackers' which is, of course, a word you see coming into vogue today."

And when Egleson's underground newspaper, *The Old Mole*, needed mailing lists, Egleson "got access" to an MIT computer to run them. "It was an old line printer that worked from punch cards. So, to get it up for printing 3-up labels, you had to program it with what are called 'jumpers,' like a switchboard. It wasn't ac-

tually a computer, but it had enough stuff to work like one and . . ." He pauses a moment. Nerds are not incapable of introspection.

"I believe that you *have* to master the technology in order to be creative. The juncture of creativity and the technology that makes it possible has always been important to me.

"I don't think you can write good programs unless you know the workings of the machinery on which they're going to run. In consulting people on their computer needs, I spend a lot of time with people afflicted by computer hype. People would do a lot better learning computers than actually using them. I hear kids 'need' them. Small businesses 'need' them. It's just not true. Computers are like car telephones. Some people have a use for them, the rest just have a notion. It's sometimes hard to tell which category you fall into."

* * *

No problem with Anneke Wyman. When you say "nerd" she doesn't blanch; she doesn't even blink. In fact, Anneke is bi-nerdal. "I spend three hours a day on my ballet," she says, "and a lot of the rest on my computer."

Right now, the 15-year-old blond-haired, blue-eyed, lissome-bodied Ms. Wyman is drinking coffee in the Manhattan Squash Club, idly eyeballing the Empire State Building outside that club's giant three-story windows. What's a nerd girl like you doing in a place like this?

"You asked me here."

Oh yeah.

Anneke Wyman has no trouble tracing her affliction. She used a DEC for math in the second grade at Spence, one of Manhattan's most prestigious private schools. In the fifth grade she worked out her first program. "It was writing my name five times." Beginning about the eighth grade, "the programs seemed to be getting easier and easier," she says, "and we got into Logo, Pascal,

and FORTRAN and they were easy.

"I wasn't the best in the class. I mean there were others just as good. But I felt . . . you know."

Actually, no.

"I took piano for a couple of years," she explains, slowly, as if to a deaf person, "and it was always a huge pain. The computer wasn't a pain. Oh, sure, the memorizing was a pain but then in the eighth grade it just stopped being a pain. That's when I realized I should think about making a life out of this."

Ballet took a back seat. While she still works hard at the *barre*, she's not serious about a career anymore. It's not like when she was nine and danced with the Berlin Opera Ballet at the Metropolitan Opera. Or like the three times she's appeared in "The Nutcracker."

"Oh, I've been a kid, a soldier, and a candy cane." Now she's a nerd.

"Well . . ."

No boyfriends? "No. Well, I have boyfriends but they're really friends who are boys, you know? My roommate had a boyfriend, but he got kicked out of school so . . . look, there are some girls who have boyfriends and some who don't. I don't."

Anneke Wyman contents herself with being on the Atari Youth Advisory Board, which consists of a couple of dozen or so kids that Atari uses to better understand the youth market.

"It was neat when they flew us out there," she remembers. "I went out with a Dalton boy. And we had lunch and a tour and then we met Kasser who was the chairman of the board at the time, and he asked us if we had any questions about Atari, or any suggestions. You know, right off the bat.

"Well, some of the kids said there was too little memory (18k less than the VIC at the time), and some others talked about the disk problem—programs were crashing. But they knew about all that stuff and were working on everything already.

"So then he asked me, and the fact

is I'd worked on about every computer but Atari. I didn't know what to say. So I asked him how you get to be a CEO. He said, 'work hard.'"

Out of Anneke's group of advisors there is already one solid looking game program on the way, "and some kid in California who's set up his own consulting firm. He's only 15!"

Anneke is working on graphics. But nothing big, yet. And nothing at all on hardware. "I don't know very much about electronic circuitry. At school when a computer goes down, I'm sometimes able to fix it but I mean if you took a computer apart for me, it would stay apart. Fiddling around with little pieces of wire is not one of my specialties."

Her specialty is flow, or something like that. "It's a little like piano," she says. "It's an organizations sequence, programming. Notes out of order just sound awful. There are keys and sequences in almost every computer language that just go together. You can think of them as primal chords."

"Repeat" and "Until" is an over-obvious example in Pascal.

"And then there are more or less complicated ones, just like there are more or less complicated chords on the piano. And like on the piano, sometimes you just feel things rather than know things, you know? It's like the imperfect in French. I don't know why I use it in certain places. I just know it goes there."

Simple as that. Can you hear Koopman chomping on his Bic? Is that Egleson twirling in his office chair?

It's a new world every day. Anneke Wyman is interested neither in programming nor hardware. "I'm interested in making money," she says. "The computer is just a tool for that. I'm going to graduate college in 1990. I'm expecting a totally computerized world. I'm just interested in finding an application that might be new and exciting, a computer power vacuum that I can fill."

What's in a nerd? What isn't! 🔳

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